

To: Laidlaw, Tina[Laidlaw.Tina@epa.gov]
From: Blend, Jeff
Sent: Fri 8/15/2014 8:29:38 PM
Subject: WWTPs under 1MGD cost to get to WERF Level 2__plus over 1 MGD getting to WERf 2.docx
WWTPs under 1MGD cost to get to WERF Level 2__plus over 1 MGD getting to WERf 2.docx

The attached uses numbers from various sources and should be up to date for 2013. A few towns used a Dept of Commerce target rate for current wastewater bill.

Jeff

NWG Study of Costs of Treatment for Towns with Non-Lagoon Systems

Two information requests were asked of the Montana Nutrient Work Group concerning the costs of treatment for nutrients in water. The first question is whether non-lagoon wastewater systems less than 1 million gallons per day in design capacity (< 1 MGD) would be able to meet the general variance nutrient levels versus having to apply for an individual economic variance due to economic hardship.¹ The second question is how many non-lagoon systems (both above and below 1 MGD) would be able to meet the 'next level of nutrient treatment' beyond the general variance. The general variance level that must currently be met is 15 TN and 2 TP for systems < 1 MGD and is 10 TN and 1 TP for systems > 1 MGD. For this study, it is assumed that the 'next level of nutrient treatment' beyond the general variance would be 6 TN and 0.3 TP---a marginally more stringent level than the general variance and consistent with recent proposals by the Montana League of Cities and Towns.

Costs of treating nutrients were estimated from the DRAFT Interim WERF study "*Finding the Balance Between Wastewater Treatment Nutrient Removal and Sustainability, Considering Capital and Operating Costs, Energy, Air and Water Quality and More*" (WERF, 2011). The WERF study looked at five different levels of nutrient treatment from minimal treatment (level 1) to a very stringent treatment that is close to Montana's base nutrient criteria standard (level 5). Level 5 would more or less meet Montana's nutrient criteria (coming up just short on TN but being more stringent than the criteria for TP). Level 1 treatment in the WERF study, while more advanced than lagoons, does not directly treat N and P. WERF Level 2 treatment is about the same as the general variance levels discussed in the previous paragraph and outlined in SB 367 (actually, WERF Level 2 is a bit more stringent). WERF Level 3 treatment approximately corresponds with the 'next level of nutrient treatment' beyond the general variance or about 6 TN and 0.3 TP.

Table 3. Effluent Quality and Associated Treatment Costs in the Interim WERF study (WERF 2011)

Level	Description	Capital Cost (million dollars per 1 GPD design flow)	Operations Cost (dollars per day per 1 MGD actual flow)
Level 1	No N and P removal	9.3	250
Level 2	1 mg/l TP; 8 mg/l TN	12.7	350
Level 3	0.1-0.3 mg/l TP; 4-8 mg/l TN	14.4	640
Level 4	<0.1 mg/l TP; 3 mg/l TN	15.3	880
Level 5	<0.01 mg/l TP; 1 mg/l TN	21.8	1370

Following the Interim EPA's Interim Economic Guidance for Water Quality Standards², the first of two major "tests" in the Substantial determination (the first step) is to demonstrate that meeting the numeric nutrient criteria today (for our purposes here, meeting the general variance level) would cost more than 2% of a community's Median Household Income (MHI) for most or all Montana communities with affected WWTPs. EPA defines 'affordable' as 2% MHI, and that definition is used for this study. For this step, DEQ calculated the "Municipal Preliminary Screener (MPS)" value per the guidance for a subset of dischargers reviewed as part of DEQ's demonstration. The MPS is an estimate of the average per household cost of proposed pollution controls plus existing wastewater fees as a percent of median household income for that town (%MHI). If the MPS value for these fees for an average household is

¹ EPA regulations allow a variance from a water quality standard if the pollutant controls "...would result in substantial and widespread economic and social impact" (40 CFR 131.10(g)(6)).

² http://water.epa.gov/scitech/swguidance/standards/upload/2007_06_18_standards_econworkbook_complete.pdf

equal to or greater than 2% MHI for a given town, then the Guidance suggests Substantial impacts.

Twenty-seven publicly owned WWTPs were evaluated as almost the entire sample of non-lagoon systems in the state of Montana. Fifteen of these are under 1 MGD in size and twelve are over 1 MGD. To address the first step in the Substantial test, the MPS, DEQ developed a detailed Excel spreadsheet to calculate the annualized capital and operations and maintenance costs (O&M) associated with meeting WERF level 2 and WERF level 3 for the 27 towns. For towns greater than 1 MGD, only WERF level 3 was calculated per the information request, as it is assumed that all towns with systems greater than 1 MGD are able to affordably meet the general variance (WERF level 2), although Livingston would likely see costs greater than 2% MHI to meet WERF level 2. For towns with systems less than 1 MGD, both WERF level 2 and 3 were calculated per the information request.

Current nutrient treatment levels and treatment costs at each facility were compared to nutrient levels and costs that would be needed to meet WERF Levels 2 and 3. In this way, annual capital and operations costs needed for meeting base nutrient criteria were applied to each town, and new wastewater bills were estimated for a scenario where towns would have to meet these levels (if they are not meeting them already). If a town already met WERF level 3 nutrient levels, then that town would not have any additional costs. If a town already met WERF level 2 levels, then the costs of getting to WERF level 3 would have level 2 costs subtracted for both capital and operations to calculated additional costs. It is important to note that the operations costs of meeting base numeric criteria taken from the WERF study (**Table 3**) do not include labor and maintenance costs, so the cost estimates will low (actual costs would be higher). Also, economies of scale likely apply to building new facilities so that smaller town cost estimates may be low in that sense (actual costs would be higher).

It is also important to note that some towns have been able to treat nutrients by simply optimizing their systems, so that these cost estimates may be much higher in some cases than what could occur with optimization rather than intensive new capital investments. The ability to optimize is very site specific. In 2012, the towns of Chinook, Conrad and Manhattan took measures to optimize their systems for better performance and saw improvement in average measures for TN, and other parameters (Paul LaVigne).

Part 1: Estimated Cost to Towns with Non-Lagoon WWTP Less than 1 MGD of Reaching WERF Level 2

This analysis finds that most towns with a non-lagoon system < 1 MGD would be able to afford the general variance levels using EPA's 2% Median Household Income threshold for existing plus new wastewater costs. We looked at almost every town with a non-lagoon system < 1 MGD and ran the cost numbers of what it would cost to get each of these towns to a WERF Level 2 from their current levels. A few of the towns already meet WERF level 2 and would not have to bear additional costs.

Conclusion: Only one town with a non-lagoon system of less than 1 MGD would bear costs significantly greater than 2% to meet the general variance levels of 15 TN and 2 TP (which corresponds approximately to WERF Level 2). That town would be Poplar, and it is not regulated by the DEQ. Thus, most towns with non-lagoon would be able to meet the general variance without significant economic difficulty.

Graph of Percent MHI for Current Average Wastewater Bill and Total Average Wastewater Bill to reach the General Variance Level of WERF Level 2 (for towns with non-lagoon wastewater plants Less than 1 MGD)

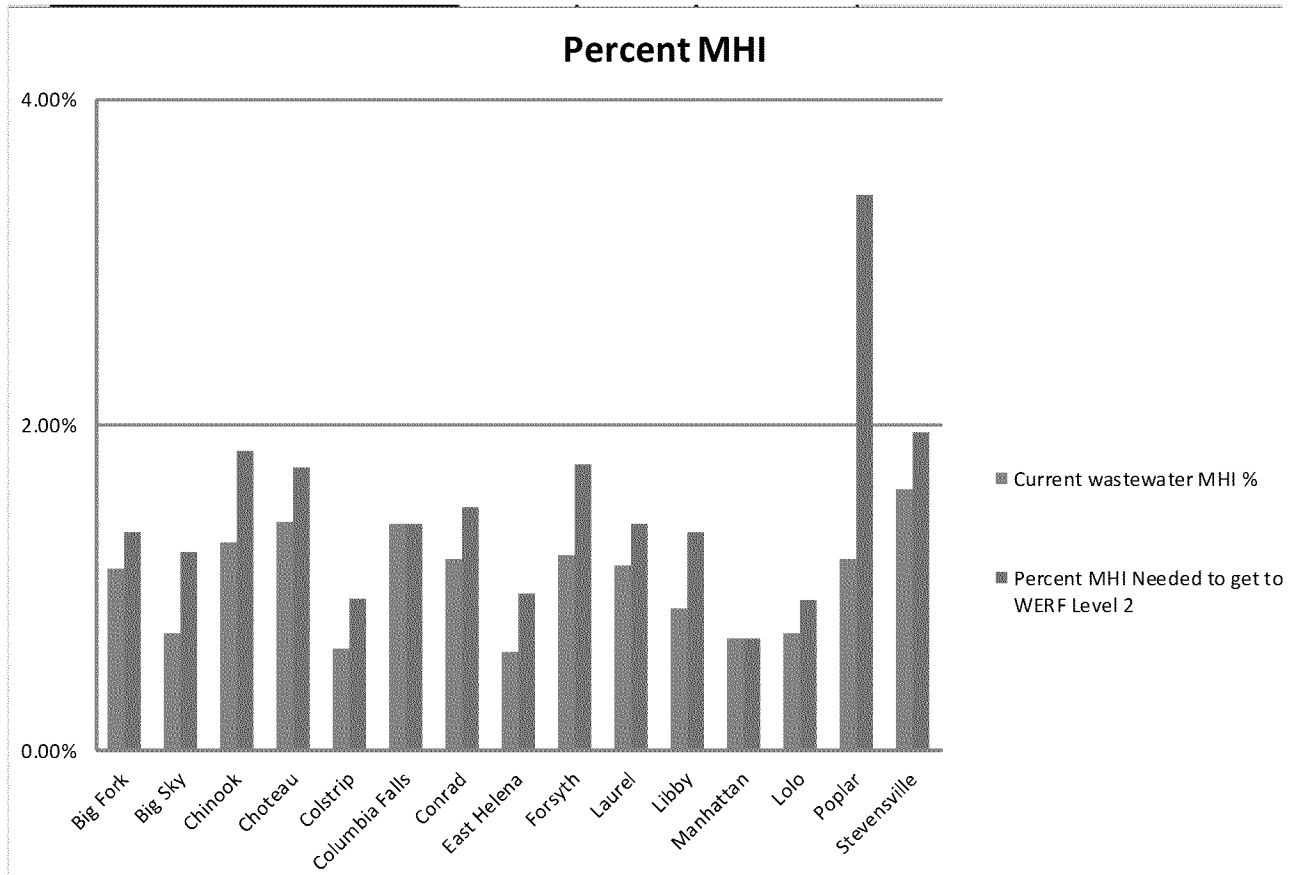


Table A-1. Summary Demographic Data for the Towns < 1 MGD and MHI Calculation for Towns < 1 MGD to reach WERF Level 2

Community	Median Household Income (2010) - ACS 5 year survey	Population	Estimated Number of Households (ACS or Population / 2.5) based on 2010	Current Average Annual Household Wastewater Bill (1000 gallons/month)	Design Flow (MGD)	Actual Flow (MGD)	Current wastewater MHI %	Percent MHI Needed to get to WERF Level 2	Percent Increase over current Wastewater Bill to Reach WERF 2
Big Fork	\$52,147.00	4,270	1,708	\$580.36	0.69	0.3	1.11%	1.34%	20%
Big Sky	\$49,850.00	2,308	514	\$357.24	0.44	0.22	0.72%	1.22%	70%
Chinook	\$36,389.00	1,203	696	\$464.88	0.5	0.167	1.28%	1.84%	44%
Choteau	\$33,241.00	1,684	802	\$464.88	0.3	0.219	1.40%	1.74%	24%
Colstrip	\$74,095.00	2,214	812	\$464.88	0.6	0.48	0.63%	0.93%	48%
Columbia Falls	\$38,107.00	4,688	1,875	\$532.20	0.766	0.37	1.40%	1.40%	0%
Conrad	\$39,444.00	2,570	1,208	\$464.88	0.5	0.375	1.18%	1.49%	27%
East Helena	\$46,227.00	1,984	794	\$279.60	0.434	0.322	0.60%	0.96%	59%
Forsyth	\$38,661.00	1,777	722	\$464.88	0.54	0.248	1.20%	1.76%	47%
Laurel	\$40,906.00	6,718	2,603	\$464.88	0.88	0.853	1.14%	1.39%	22%
Libby	\$25,167.00	2,628	1,290	\$218.52	0.511	0.381	0.87%	1.34%	54%
Manhattan	\$52,350.00	1,520	523	\$362.40	0.6	0.4	0.69%	0.69%	0%
Lolo	\$50,469.00	3,892	1,060	\$363.00	0.34	0.38	0.72%	0.92%	28%
Poplar	\$19,026.00	810	405	\$224.04	0.6	0.24	1.18%	3.41%	190%
Stevensville	\$33,293.00	1,809	795	\$535.08	0.3	0.29	1.61%	1.96%	22%

Note: Big Sky, East Helena, Libby and Poplar used a target rate of what the department of Commerce thought was affordable for their current wastewater rates. Source: MT Gov – Dept. of Commerce site (TSEP) which uses 2000 Census and 2003 info via Shari Johnson, City of Polson.

Table A-2: Cost Worksheet for Towns less than 1 MGD—Details Using WERF Capital and Operations Costs

Community	Current Treatment Technology	Design Flow (MGD)	Actual Flow (MGD)	# of Households	Current WW annual bill	MHI 2010 (ACS 5 year estimate)	Capital cost (million dollars) to meet WERF 2	Annual Capital cost to meet WERF 2 (dollars)	Annual Operations costs to meet WERF 2 (dollars)	Annual Capital and Operations cost (\$)
Big Fork	Assume WERF Level 1	0.69	0.3	1,708	\$580.36	\$52,147.00	2.35	\$188,149	\$10,950	\$199,099
Big Sky	Assume WERF Level 1	0.44	0.22	514	\$357.24	\$49,850.00	1.50	\$119,979	\$8,030	\$128,009
Chinook	Assume WERF Level 1	0.5	0.167	696	\$464.88	\$36,389.00	1.70	\$136,340	\$6,096	\$142,436
Choteau	Assume WERF Level 1	0.3	0.219	802	\$464.88	\$33,241.00	1.02	\$81,804	\$7,994	\$89,798
Colstrip	Assume WERF Level 1	0.6	0.48	812	\$464.88	\$74,095.00	2.04	\$163,608	\$17,520	\$181,128
Columbia Falls	Assume WERF Level 3. Newer plant with good control. Designed to achieve 8 mg/l TN	0.766	0.37	1,875	\$532.20	\$38,107.00	0.00	\$0	\$0	\$0
Conrad	Assume WERF Level 1	0.5	0.375	1,208	\$464.88	\$39,444.00	1.70	\$136,340	\$13,688	\$150,028
East Helena	Assume WERF Level 1	0.434	0.322	794	\$279.60	\$46,227.00	1.48	\$118,343	\$11,753	\$130,096
Forsyth	Assume WERF Level 1	0.54	0.248	722	\$464.88	\$38,661.00	1.84	\$147,247	\$9,052	\$156,299
Laurel	Assume WERF Level 1	0.88	0.853	2,603	\$464.88	\$40,906.00	2.99	\$239,958	\$31,135	\$271,093
Libby	Assume WERF Level 1	0.511	0.381	1,290	\$218.52	\$25,167.00	1.74	\$139,339	\$13,907	\$153,246
Manhattan	Assumed WERF Level 3. Denitrification with fixed film suspended growth system, clarifiers and aerobic sludge digestion, UV	0.6	0.4	523	\$362.40	\$52,350.00	0.00	\$0	\$0	\$0
Lolo	WERF Level 1. No steps towards nutrient removal.	0.34	0.38	1,060	\$363.00	\$50,469.00	1.16	\$92,711	\$13,870	\$106,581
Poplar	Assume WERF Level 1	0.6	0.24	405	\$224.04	\$19,026.00	2.04	\$163,608	\$8,760	\$172,368
Stevensville	WERF Level 1. TN generally below 20 and TP less than 4.	0.3	0.29	795	\$535.08	\$33,293.00	1.02	\$81,804	\$10,585	\$92,389

NOTE: Operation costs include energy and chemical costs only and do not include labor and maintenance cost. As such, these

NOTE: The numbers are intended to provide ROUGH ESTIMATES for discussion purposes and do not reflect the site-specific conditions at each plant.

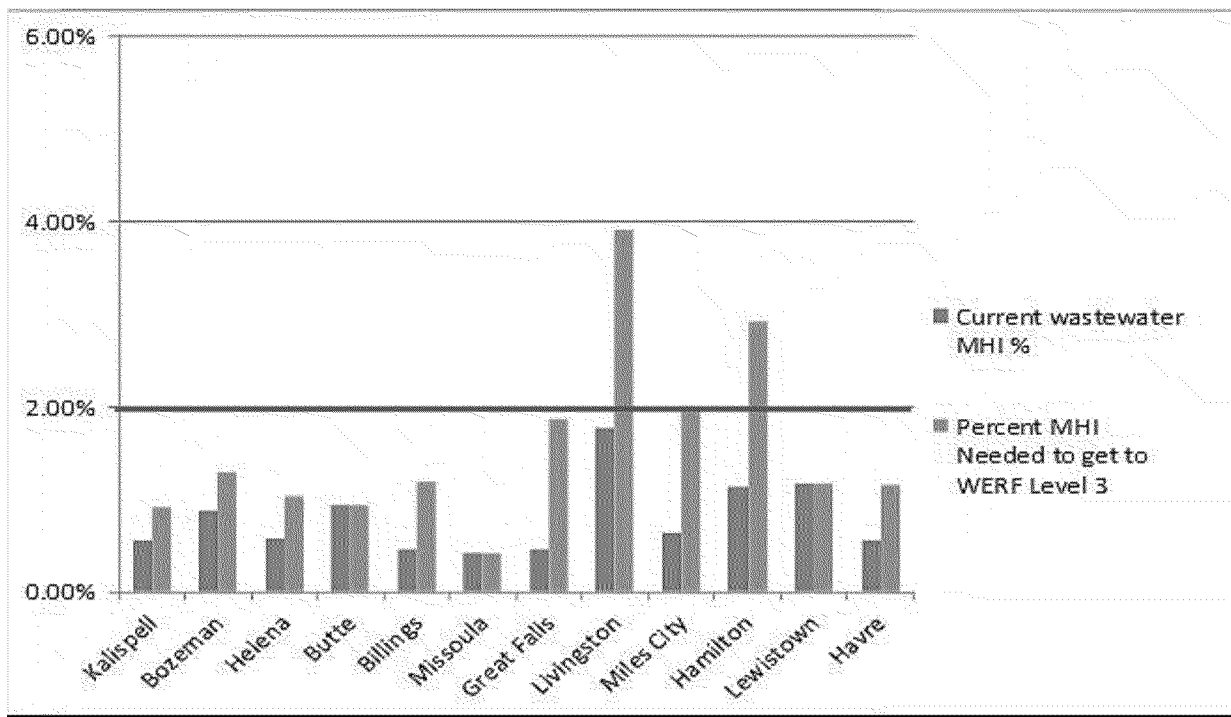
Table A-3. WERF Cost calculations for Sample—Going from WERF Level 1 to WERF Level 2 (Columbia Falls and Manhattan who already meet WERF Level 2).

Costs to Meet Criteria	Capital Cost per MGD to Get To WERF 2 (\$million/ MGD)	Design Flow of Facility	Total Facility Upgrade Capital Costs (\$million)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$/year)	Operation cost per day per 1 MG treated (dollars)	Operations Costs (\$/ year/ 1 MGD)	Actual Flow	Annualized Facility Upgrade Operations Costs based on Facility MGD
Big Fork	3.4	0.69	\$2.35	0.1881492	\$188,149.20	100	36,500.00	0.3	\$10,950.00
Big Sky	3.4	0.44	\$1.50	0.1199792	\$119,979.20	100	36,500.00	0.22	\$8,030.00
Chinook	3.4	0.5	\$1.70	0.13634	\$136,340.00	100	36,500.00	0.167	\$6,095.50
Choteau	3.4	0.3	\$1.02	0.081804	\$81,804.00	100	36,500.00	0.219	\$7,993.50
Colstrip	3.4	0.6	\$2.04	0.163608	\$163,608.00	100	36,500.00	0.48	\$17,520.00
Columbia Falls	0	0.766	\$0.00	0	\$0.00	0	0.00	0.37	\$0.00
Conrad	3.4	0.5	\$1.70	0.13634	\$136,340.00	100	36,500.00	0.375	\$13,687.50
East Helena	3.4	0.434	\$1.48	0.11834312	\$118,343.12	100	36,500.00	0.322	\$11,753.00
Forsyth	3.4	0.54	\$1.84	0.1472472	\$147,247.20	100	36,500.00	0.248	\$9,052.00
Laurel	3.4	0.88	\$2.99	0.2399584	\$239,958.40	100	36,500.00	0.853	\$31,134.50
Libby	3.4	0.511	\$1.74	0.13933948	\$139,339.48	100	36,500.00	0.381	\$13,906.50
Manhattan	0	0.6	\$0.00	0	\$0.00	0	0.00	0.4	\$0.00
Lolo	3.4	0.34	\$1.16	0.0927112	\$92,711.20	100	36,500.00	0.38	\$13,870.00
Poplar	3.4	0.6	\$2.04	0.163608	\$163,608.00	100	36,500.00	0.24	\$8,760.00
Stephensville	3.4	0.3	\$1.02	0.081804	\$81,804.00	100	36,500.00	0.29	\$10,585.00

Part 2: Estimated Cost to All Towns with Non-Lagoon WWTPs of Reaching WERF Level 3—The Next Increment of Nutrient Treatment

Conclusion: This analysis finds that most towns with a non-lagoon system greater than 1 MGD would be able to afford the next increment of nutrient treatment beyond general variance levels using EPA's 2% Median Household Income threshold for existing plus new wastewater costs. We looked at almost every town with a non-lagoon system > 1 MGD and ran the cost numbers of what it would cost to get each of these towns to a WERF Level 3 from their current levels. A few of the towns already meet WERF level 3 and would not have to bear additional costs. Out of 12 towns, Hamilton and Livingston would have potential problems meeting WERF Level 3 affordably using the 2% criteria.

Graph of Percent MHI for Current Wastewater Bills and Bill to reach WERF Level 3 (for towns with non-lagoon wastewater plants more than 1 MGD)



Conclusion: Interestingly, most towns with non-lagoon systems less than 1 MGD would also be able to meet WERF Level 3. This is due in part to low design flows of these systems. Out of 15 towns, four would have costs greater than 2% MHI to meet WERF Level 3, but three of those would be just above 2%. These numbers may be biased low, as it is likely that WERF Level 3 costs are underestimated due to economies of scale and not including labor and some maintenance. It is thus possible that more towns than the four below would have economic difficulty meeting WERF Level 3.

Graph of Percent MHI for Current Wastewater Bills and Bill to reach WERF Level 2 and WERF Level 3 (for towns with non-lagoon wastewater plants Less than 1 MGD)

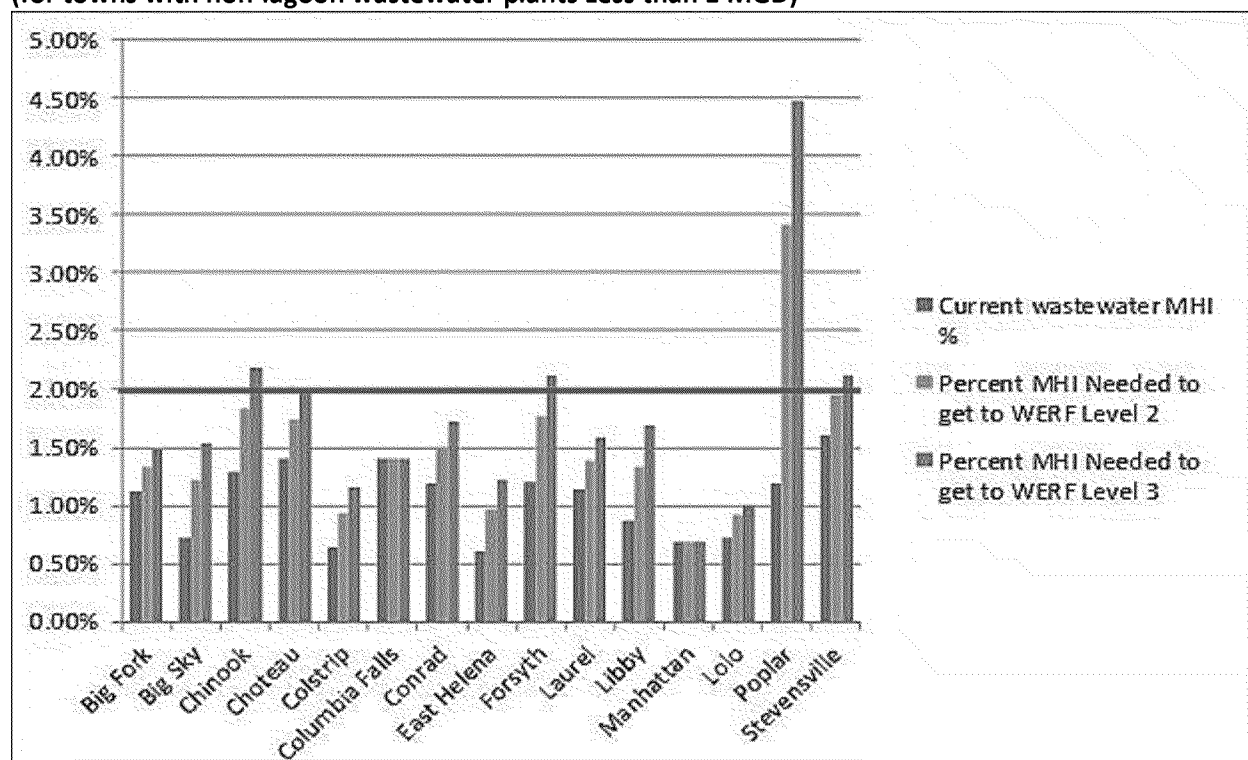


Table B-1. Summary Demographic Data for the Sample Towns Including Current Wastewater Fee MHI and MHI needed to get to WERF Level 3 as well as Percent Increase in Current Wastewater Bill

Community	Median Household Income (2009) - ACS	Current wastewater MHI %	Percent MHI Needed to get to WERF Level 2	Percent MHI Needed to get to WERF Level 3	Percent increase in current wastewater bill to get to WERF 3
More Than 1 MGD					
Kalispell	\$39,023	0.55%	0.55%	0.91%	63.95%
Bozeman	\$42,218	0.88%	0.88%	1.29%	45.90%
Helena	\$46,313	0.57%	0.85%	1.03%	80.49%
Butte	\$38,178	0.94%	0.94%	0.94%	0.00%
Billings	\$46,433	0.47%	0.87%	1.19%	152.49%
Missoula	\$36,547	0.42%	0.42%	0.42%	0.00%
Great Falls	\$40,935	0.46%	1.25%	1.87%	310.00%
Livingston	\$33,937	1.77%	3.10%	3.92%	121.80%
Miles City	\$37,268	0.63%	1.46%	2.00%	216.48%
Hamilton	\$24,234	1.14%	2.25%	2.93%	157.03%
Lewistown	\$32,997	1.17%	1.17%	1.17%	0.00%
Havre	\$42,518	0.56%	0.91%	1.16%	104.78%
Less than 1 MGD					
Big Fork	\$44,398.00	1.11%	1.34%	1.48%	32.78%
Big Sky	\$48,850.00	0.72%	1.22%	1.54%	115.07%
Chinook	\$43,311.00	1.28%	1.84%	2.18%	70.55%
Choteau	\$36,198.00	1.40%	1.74%	1.98%	41.27%
Colstrip	\$77,679.00	0.63%	0.93%	1.15%	83.11%
Columbia Falls	\$38,750.00	1.40%	1.40%	1.40%	0.00%
Conrad	\$35,682.00	1.18%	1.49%	1.72%	45.92%
East Helena	\$47,219.00	0.60%	0.96%	1.21%	100.66%
Forsyth	\$35,556.00	1.20%	1.76%	2.12%	76.32%
Laurel	\$42,175.00	1.14%	1.39%	1.59%	39.78%
Libby	\$27,267.00	0.87%	1.34%	1.68%	93.39%
Manhattan	\$50,729.00	0.69%	0.69%	0.69%	0.00%
Lolo	\$46,442.00	0.72%	0.92%	1.01%	39.75%
Poplar	\$19,464.00	1.18%	3.41%	4.48%	280.12%
Stevensville	\$33,776.00	1.61%	1.96%	2.11%	31.33%

Table B-2: Cost Worksheet—Details Using WERF Capital and Operations Costs

Design Flow (MGD)	Actual Flow (MGD)	# of Households (2010) ACS five year	Current WW annual bill	MHI 2010 (ACS 5 year estimate)	Annual Capital cost to meet WERF 3 (dollars)	Annual Operations costs to meet WERF 3 (dollars)	Annual Capital and Operations cost (\$)	Current MHI	MHI to Meet WERF Level 3	Pe incr Wast
5.4	3.10	7,705	\$216	\$39,023	\$0.00	\$0.00	\$0	0.55%	0.55%	
13.8	5.80	14,614	\$372	\$42,218	\$0.00	\$0.00	\$0	0.88%	0.88%	
5.4	3.00	12,337	\$265	\$46,313	\$1,472,472.00	\$109,500.00	\$1,581,972	0.57%	0.85%	
8.5	4.00	14,041	\$360	\$38,178	\$0.00	\$0.00	\$0	0.94%	0.94%	
26	26	41,841	\$218	\$46,433	\$6,817,000.00	\$949,000.00	\$7,766,000	0.47%	0.87%	
12	9	27,553	\$152	\$36,547	\$0.00	\$0.00	\$0	0.42%	0.42%	
26	26	23,998	\$187	\$40,935	\$6,817,000.00	\$949,000.00	\$7,766,000	0.46%	1.25%	1
5	2	3,188	\$600	\$33,937	\$1,363,400.00	\$73,000.00	\$1,436,400	1.77%	3.10%	
3.7	2	3,518	\$236	\$37,268	\$1,008,916.00	\$73,000.00	\$1,081,916	0.63%	1.46%	1
1.98	0.68	2,092	\$276	\$24,234	\$539,906.40	\$24,820.00	\$564,726	1.14%	2.25%	
2.5	1.5	2,727	\$388	\$32,997	\$0.00	\$0.00	\$0	1.17%	1.17%	
1.8	1.38	3,709	\$240	\$42,518	\$490,824.00	\$50,370.00	\$541,194	0.56%	0.91%	
Less than 1 MGD										
0.69	0.3	1,708	\$580.36	\$52,147.00	\$282,223.80	42,705.00	\$324,929	1.11%	1.48%	
0.44	0.22	514	\$357.24	\$49,850.00	\$179,968.80	31,317.00	\$211,286	0.72%	1.54%	1
0.5	0.167	696	\$464.88	\$36,389.00	\$204,510.00	23,772.45	\$228,282	1.28%	2.18%	
0.3	0.219	802	\$464.88	\$33,241.00	\$122,706.00	31,174.65	\$153,881	1.40%	1.98%	
0.6	0.48	812	\$464.88	\$74,095.00	\$245,412.00	68,328.00	\$313,740	0.63%	1.15%	
0.766	0.37	1,875	\$532.20	\$38,107.00	\$0.00	0.00	\$0	1.40%	1.40%	
0.5	0.375	1,208	\$464.88	\$39,444.00	\$204,510.00	53,381.25	\$257,891	1.18%	1.72%	
0.434	0.322	794	\$279.60	\$46,227.00	\$177,514.68	45,836.70	\$223,351	0.60%	1.21%	1
0.54	0.248	722	\$464.88	\$38,661.00	\$220,870.80	35,302.80	\$256,174	1.20%	2.12%	
0.88	0.853	2,603	\$464.88	\$40,906.00	\$359,937.60	121,424.55	\$481,362	1.14%	1.59%	
0.511	0.381	1,290	\$218.52	\$25,167.00	\$209,009.22	54,235.35	\$263,245	0.87%	1.68%	
0.6	0.4	523	\$362.40	\$52,350.00	\$0.00	0.00	\$0	0.69%	0.69%	
0.34	0.38	1,060	\$363.00	\$50,469.00	\$139,066.80	13,870.00	\$152,937	0.72%	1.01%	
0.6	0.24	405	\$224.04	\$19,026.00	\$245,412.00	8,760.00	\$254,172	1.18%	4.48%	2
0.3	0.29	795	\$535.08	\$33,293.00	\$122,706.00	10,585.00	\$133,291	1.61%	2.11%	

Table B-3. WERF Cost calculations for Sample to Reach WERF Level 3

Capital Cost to Meet WERF 3 per MGD (\$million/MGD)	Design Flow	Total Facility Upgrade Capital Costs (\$million)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$/year)	Operations cost per MG Treated per day	Operations Costs (\$/ year/ 1 MGD)	Actual Flow	Facility Upgrade Operations Costs (annual) based on Facility MGD
Greater than 1 MGD								
0	5.4	\$0.00	\$0.00	\$0.00	0	0.00	3.10	\$0.00
0	13.8	\$0.00	\$0.00	\$0.00	0	0.00	5.80	\$0.00
3.4	5.4	\$18.36	\$1.47	\$1,472,472.00	100	36,500.00	3.00	\$109,500.00
0	8.5	\$0.00	\$0.00	\$0.00	0	0.00	4.00	\$0.00
3.4	25	\$85.00	\$6.82	\$6,817,000.00	100	36,500.00	26.00	\$949,000.00
0	12	\$0.00	0	\$0.00	0	0.00	9.00	\$0.00
3.4	25	\$85.00	6.817	\$6,817,000.00	100	36,500.00	26	\$949,000.00
3.4	5	\$17.00	\$1.36	\$1,363,400.00	100	36,500.00	2.00	\$73,000.00
3.4	3.7	\$12.58	\$1.01	\$1,008,916.00	100	36,500.00	2.00	\$73,000.00
3.4	1.98	\$6.73	0.5399064	\$539,906.40	100	36,500.00	0.68	\$24,820.00
0	2.5	\$0.00	0	\$0.00	0	0.00	1.50	\$0.00
3.4	1.8	\$6.12	0.490824	\$490,824.00	100	36,500.00	1.38	\$50,370.00
Less Than 1 MGD								
5.1	0.69	\$3.52	0.2822238	\$282,223.80	390	142,350.00	0.3	\$42,705.00
5.1	0.44	\$2.24	0.1799688	\$179,968.80	390	142,350.00	0.22	\$31,317.00
5.1	0.5	\$2.55	0.20451	\$204,510.00	390	142,350.00	0.167	\$23,772.45
5.1	0.3	\$1.53	0.122706	\$122,706.00	390	142,350.00	0.219	\$31,174.65
5.1	0.6	\$3.06	0.245412	\$245,412.00	390	142,350.00	0.48	\$68,328.00
0	0.766	\$0.00	0	\$0.00	0	0.00	0.37	\$0.00
5.1	0.5	\$2.55	0.20451	\$204,510.00	390	142,350.00	0.375	\$53,381.25
5.1	0.434	\$2.21	0.17751468	\$177,514.68	390	142,350.00	0.322	\$45,836.70
5.1	0.54	\$2.75	0.2208708	\$220,870.80	390	142,350.00	0.248	\$35,302.80
5.1	0.88	\$4.49	0.3599376	\$359,937.60	390	142,350.00	0.853	\$121,424.55
5.1	0.511	\$2.61	0.20900922	\$209,009.22	390	142,350.00	0.381	\$54,235.35
0	0.6	\$0.00	0	\$0.00	0	0.00	0.4	\$0.00
5.1	0.34	\$1.73	0.1390668	\$139,066.80	390	36,500.00	0.38	\$13,870.00
5.1	0.6	\$3.06	0.245412	\$245,412.00	390	36,500.00	0.24	\$8,760.00
5.1	0.3	\$1.53	0.122706	\$122,706.00	390	36,500.00	0.29	\$10,585.00

Community	Current Treatment Technology	Would the criteria apply? Or is there dilution capability?	Design Flow (MGD)	Actual Flow (MGD)	Community Population (Census 2010)	Number of Households (American Community Survey 2005-2009)
Big 7 Communities						
Kalispell	BNR (modified Johannesburg); 3.1 to 5.4 MGD; avg. .12 mg/l TP; 10 mg/l TN.	Yes. EOP; Ashley Creek	5.4	3.10	19,927	7,705
Bozeman	some BNR now; 5-stage Barrdenpho; new plant will be BNR (1 mg/l TP; 3 mg/l TN starting in 2011); current 5.8 MGD; increasing to 13.9 mgd	Yes. Also Gallatin TMDL in the works.	13.8	5.80	37,280	14,614
Helena	BNR; 3 mg/l TP; 10 mg/l TN; design capacity of 5.4; current discharge ~3.0 MGD	Yes. WLA set in TMDL based on numeric criteria.	5.4	3.00	28,190	12,337
Butte	Current technology is activated sludge (TN of 18.5 mg/l; TP of 2.11 mg/l); under Order to Construct to membrane BNR; current design is 8.5 MGD; talking about lowering to 6.1 MGD. Sewer Fee based on DEQ estimates. Included in current fee is \$27 million upgrade in new capital costs and \$1.125 million in O&M costs which would bring them to 5 TN and 0.1 TP	Yes. EOP.	8.5	4.00	33,525	14,041
Billings	2ndary treatment; Design flow of 26 MGD (avg.) and 40 MGD max.	Yes. Discharge into the Yellowstone River.	26	26	104,170	41,841
Missoula	advanced secondary treatment facility with biological nutrient removal and ultraviolet disinfection; meets Clark Fork criteria w/ mixing zone. 8.2 mg/l TN; 0.16 -0.4 mg/l TP; get a mixing zone, meeting criteria currently. BNR. Design flow = 12 MGD ; actual flow = 9 MGD. (designed for 10 and 1). (HDR)	Yes. With mixing zone. Currently meeting criteria after mixing zone.	12	9	66,788	27,553

Great Falls	conventional 2ndary activated sludge (max 21-MGD; avg. 10 MGD)	Yes. Missouri River	26	26	58,505	23,998
Other Large Communities > 1 MGD						
Livingston	discharges into the Yellowstone; permit renewed in 2010; mechanical plant w/ 2 primary clarifiers, 3 rotating biological contactors, UV, installing co-composting. DMR shows 11 mg/l TN average (20 mg/l for May) and 2 mg/l TP (3 mg/l for May).	Yes. Discharge into the Yellowstone River.	5	2	7,044	3,188
Miles City	2ndary treatment plus oxidation ditch. 2011 permit. Algae plant study to remove nutrients. Extended aeration system w/2 oxidation ditches w/rotating brush aerators; 2 clarifiers and chlorine basin. TN avg of 23.5 mg/l; TP avg. 3.6 mg/l.	Yes. Discharge into the Yellowstone River.	3.7	2	8,410	3,518
Hamilton	BNR facility. t w/ extended aeration system. Oxidation ditch w/ rotating brush aerators. 3 clarifiers. Upgraded in 2010. TN avg. 5.5 mg/l; TP avg. 5 mg/l.	Yes	1.98	0.68	4,348	2,092
Lewistown	BNR plant. Focus on TP removal. 0.8 mg/l TP; 3-4 mg/l TN.	Yes	2.5	1.5	5,901	2,727
Havre	Discharges into the Milk River. Permit renewed in 2011. Activated sludge facility with effluent chlorination. 2006-2010 data showed avg. TP of 3.4 (TN not required). 2011 DMR showed TN of 19.4 mg/l; Tp of 1.3 mg/l.	Yes	1.8	1.38	9,310	3,709
Non-Lagoon Facilities with < 1MGD						
Columbia Falls	Newer plant. Designed to achieve 8 mg/l TN	Yes	0.766	0.37	4,688	1,621

Manhattan	Discharges into Diva Ditch. Permit renewed in 2010. Denitrification with fixed film suspended growth system, clarifiers and aerobic sludge digestion, UV. DMR data from winter quarter shows 11 mg/l TN and 1 mg/l TP. 2008-2010 showed avg. TN of 14 mg/l TN and 4 mg/l TP.	Yes	0.6	0.4	1,520	523
Lolo	No steps towards nutrient removal. For Lolo, TN is generally less than 30 mg/l and TP less than 7. Generally heaving loadings for Lolo. Sewer rates--Lolo \$30.25-ish/mo - (RSID) based on property values	Yes	0.34	0.38	3,892	1,060
Stevensville	Stevensville is generally a little better with TN generally below 20 and TP less than 4.	Yes	0.3	0.29	1,809	795
Lagoons						
Philipsburg	lagoon - ref: Gary Swanson, consulting engineer- 15TN, 2TP	Yes.	0.2	0.2	820	399
Cut Bank	Lagoon.	Yes	0.643	0.643	2,869	1,290
Deer Lodge	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork	Yes	3.3	1.06	3,111	1,522
Glendive	domestic WW lagoon; 3 cell facultative; current O&M costs are <\$; 8-10 capital costs for new plant. O&M increase of ~\$300,000. new avg. 1.15 MGD; PER completed to upgrade to mechanical SBR or BNR plant.	Yes	1.3	0.6	4935	1883

Median Household Income (2010) - American Community Survey.	Current average household sewer bill per year (2008 / 2011)	Current average sewer fee as % of MHI	Notes	Capital cost (million dollars) to meet the numeric nutrient criteria (WERF)	Annual Capital cost to meet the numeric nutrient criteria (L4 WERF)	Annual Operations costs to meet the numeric nutrient criteria L4WERF	Annual Capital and Operations cost (\$)
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Big 7 Communities

\$39,953.00	\$361.68	0.91%	Sewer rates obtained from City in 2011. Plant ~WERF Level 2. \$30.14/month Based on a base rate of \$15.00 with a usage rate of \$4.19/1000 gal of water used	#REF!	#REF!	#REF!	#REF!
\$41,661.00	\$372.00	0.89%	Sewer rates obtained from City in 2011. Plant ~WERF Level 2. Really Level 3 for TN and 1 for TP	#REF!	#REF!	#REF!	#REF!
\$47,152.00	\$277.80	0.59%	Sewer rates obtained from City in 2011. Plant ~ WERF Level 1.	#REF!	#REF!	#REF!	#REF!
\$37,335.00	\$360.00	0.96%	Sewer Fee based on DEQ estimates. While current monthly fee is \$13.50, the \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP (WERF 3) would raise rates to \$30 per month	#REF!	#REF!	#REF!	#REF!
\$45,004.00	\$218.28	0.49%	The numbers for Billings and Great Falls (treatment levels, treatment costs etc.) were obtained from HDR.	312.50	#REF!	#REF!	#REF!
\$34,319.00	\$152.14	0.44%	Sewer rates obtained from city. 2011 values.	#REF!	#REF!	#REF!	#REF!

\$40,718.00	\$187.20	0.46%	At WERF 1. The numbers for Billings and Great Falls (population, treatment levels, etc.) were obtained from HDR.	312.50	#REF!	#REF!	#REF!
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Other Large Communities > 1 MGD

\$35,689.00	\$600.00	1.68%	Assume WERF Tier 1	#REF!	#REF!	\$865,600	#REF!
\$37,554.00	\$236.10	0.63%	Assume WERF Tier 1	#REF!	#REF!	#REF!	#REF!
\$25,161.00	\$276.00	1.10%	Assume WERF 2 (since TN gets to WERF 3 and TP WERF 1)	24.75	#REF!	#REF!	#REF!
\$31,729.00	\$387.60	1.22%	Assume WERF 3 based on current treatment levels	18.50	#REF!	#REF!	#REF!
\$43,577	\$240.00	0.55%	Assumed WERF Level 1 and 5,000 gallons usage. Rate is \$9.15 flat plus \$2.15 per 1,000 gallons	#REF!	#REF!	#REF!	#REF!

Non-Lagoon Facilities with < 1MGD

\$38,750	\$532.20	1.37%	Upgrade to RO	\$0.00	\$0	#REF!	#REF!
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\$50,729	\$362.40	0.71%	Assumed WERF Level 2. Correct? Paul.	\$0.00	\$0	#REF!	#REF!
\$46,442	\$363.00	0.78%	Level 1.	\$1.73	\$139,067	#REF!	#REF!
\$33,776	\$535.08	1.58%		\$1.53	\$122,706	#REF!	#REF!

Lagoons

\$31,375.00	\$200.00	0.64%	Assume WERF 1	#REF!	#REF!	#REF!	#REF!
\$44,833	\$138.48	0.31%	4000 gallons. Base rate \$9.48 at 3000 gallons plus \$2.06 for next 1,000 gallons	#REF!	#REF!	#REF!	#REF!
\$40,320	\$409.56	1.02%	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork	#REF!	\$1,261,145.00	#REF!	#REF!
\$42,821	\$213.96	0.50%		#REF!	#REF!	#REF!	#REF!

\$50,123	305.28	0.61%	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	#REF!	#REF!	#REF!	#REF!
\$44,398	580.36	1.31%		#REF!	#REF!	#REF!	#REF!
\$62,614	600.00	0.96%		#REF!	#REF!	#REF!	#REF!
\$29,000	259.56	0.90%		#REF!	#REF!	#REF!	#REF!

e.

Annual Additional Cost per Household (increase in sewer rate)	Predicted average household sewer fee to meet criteria	Expected % MHI to Meet Base Numeric Nutrient Criteria (plus current wastewater fees)	Percent increase in Wastewater bill		
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WERF

Level	Description	Capital Cost (\$/gpd)	Operations (\$1/ MG/day Treated)
Level 1	No N and P removal	9.3	250
Level 2	1 mg/l TP; 8 mg/l TN	12.7	350
Level 3	0.1-0.3 mg/l TP; 4-8 mg/l TN	14.4	640
Level 4	<0.1 mg/l TP; 3 mg/l TN	15.3	880
Level 5	<0.01 mg/l TP; 1 mg/l TN	21.8	1370

Costs to Meet Criteria	Capital Cost to Meet WERF 3 per MGD (\$million/MGD)	Design Flow	Total Facility Upgrade Capital Costs (\$million)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)
Greater than 1 MGD				
Kalispell	0	5.4	\$0.00	\$0.00
Bozeman	0	13.8	\$0.00	\$0.00
Helena	3.4	5.4	\$18.36	\$1.47
Butte	0	8.5	\$0.00	\$0.00
Billings	3.4	25	\$85.00	\$6.82
Missoula	0	12	\$0.00	0
Great Falls	3.4	25	\$85.00	6.817
Livingston	3.4	5	\$17.00	\$1.36
Miles City	3.4	3.7	\$12.58	\$1.01
Hamilton	3.4	1.98	\$6.73	0.53991
Lewistown	0	2.5	\$0.00	0
Havre	3.4	1.8	\$6.12	0.49082
Less Than 1 MGD				
Big Fork	5.1	0.69	\$3.52	0.28222
Big Sky	5.1	0.44	\$2.24	0.17997
Chinook	5.1	0.5	\$2.55	0.20451
Choteau	5.1	0.3	\$1.53	0.12271
Colstrip	5.1	0.6	\$3.06	0.24541

	Columbia Falls	0	0.766	\$0.00	0
	Conrad	5.1	0.5	\$2.55	0.20451
	East Helena	5.1	0.434	\$2.21	0.17751
	Forsyth	5.1	0.54	\$2.75	0.22087
	Laurel	5.1	0.88	\$4.49	0.35994
	Libby	5.1	0.511	\$2.61	0.20901
	Manhattan	0	0.6	\$0.00	0
	Lolo	5.1	0.34	\$1.73	0.13907
	Poplar	5.1	0.6	\$3.06	0.24541
	Stephensville	5.1	0.3	\$1.53	0.12271

Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$/year)	Operations cost per MG Treated per day	Operations Costs (\$/ year/ 1 MGD)	Actual Flow	Facility Upgrade Operations Costs (annual) based on Facility MGD
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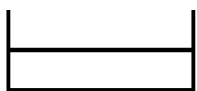
Greater than 1 MGD

\$0.00	0	0.00	3.10	\$0.00	74,400.00
\$0.00	0	0.00	5.80	\$0.00	139,200.00
\$1,472,472.00	100	36,500.00	3.00	\$109,500.00	72,000.00
\$0.00	0	0.00	4.00	\$0.00	96,000.00
\$6,817,000.00	100	36,500.00	26.00	\$949,000.00	624,000.00
\$0.00	0	0.00	9.00	\$0.00	216,000.00
\$6,817,000.00	100	36,500.00	26	\$949,000.00	624,000.00
\$1,363,400.00	100	36,500.00	2.00	\$73,000.00	48,000.00
\$1,008,916.00	100	36,500.00	2.00	\$73,000.00	48,000.00
\$539,906.40	100	36,500.00	0.68	\$24,820.00	24,000.00
\$0.00	0	0.00	1.50	\$0.00	24,000.00
\$490,824.00	100	36,500.00	1.38	\$50,370.00	33,120.00

Less Than 1 MGD

\$282,223.80	390	142,350.00	0.3	\$42,705.00
\$179,968.80	390	142,350.00	0.22	\$31,317.00
\$204,510.00	390	142,350.00	0.167	\$23,772.45
\$122,706.00	390	142,350.00	0.219	\$31,174.65
\$245,412.00	390	142,350.00	0.48	\$68,328.00

\$0.00	0	0.00	0.37	\$0.00	
\$204,510.00	390	142,350.00	0.375	\$53,381.25	
\$177,514.68	390	142,350.00	0.322	\$45,836.70	
\$220,870.80	390	142,350.00	0.248	\$35,302.80	
\$359,937.60	390	142,350.00	0.853	\$121,424.55	
\$209,009.22	390	142,350.00	0.381	\$54,235.35	
\$0.00	0	0.00	0.4	\$0.00	
\$139,066.80	390	36,500.00	0.38	\$13,870.00	
\$245,412.00	390	36,500.00	0.24	\$8,760.00	
\$122,706.00	390	36,500.00	0.29	\$10,585.00	



Community	Current Treatment Technology
> 1 MGD	
Kalispell	Already below variance levels; achieving avg. 0.12 mg/l TP and 10 mg/l TN. Town expected to pay an addition \$6,967,150.56 annually to achieve 2% MHI.
Bozeman	Already below variance levels; should be close to achieving 1 mg/l TP and 3 -5 mg/l TN starting in 2011/2-12. Town expected to pay an additional \$8,319,750.2 annually to achieve 2% MHI.
Helena	After optimization study, should be achieving variance levels. Currently at 3 mg/l TP and 10 mg/l TN. Town expected to pay an additional \$9,633,963.3 annually to achieve 2%MHI.
Butte	Under Order to Construct to membrane BNR Will already meet variance levels after upgrade. The \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP. Upgrade would result in 1.5% MHI. Additional costs needed?
Missoula	Already meets Clark Fork criteria w/ mixing zone. Achieving 8.2 mg/l TN; 0.16 -0.4 mg/l TP. Would the town be expected to pay more (~\$18 million annually) towards 2% MHI or not since they are achieving the criteria?
Great Falls	Conventional 2ndary activated sludge (max 21-MGD; avg. 10 MGD). Based on Billings case study, likely long-term variance limits of Level 4 for WERF (0-.1 mg/l TP; 3 mg/l TN)
Billings	2ndary treatment; Design flow of 26 MGD (avg.) and 40 MGD max. Based on Billings case study, likely long-term variance limits of Level 4 for WERF (0-.1 mg/l TP; 3 mg/l TN)

Livingston	Based on existing high costs, likely that meeting 1 mg/l and 10 TN would be the feasible limits. MHI of 3.05 percent to achieve WERF level 3.
Miles City	2011 permit; calculated variance limits to <0.1 mg/l TP; 3 mg/l TN
Hamilton	BNR facility. t w/ extended aeration system. Oxidation ditch w/ rotating brush aerators. 3 clarifiers. Upgraded in 2010.
Lewistown	Already below variance levels;BNR plant. Lready below proposed interim effluent limits (0.8 mg/l TP; 3-4 mg/l TN).
Facilities with < 1MGD	
Manhattan	Discharges into Diva Ditch. Permit renewed in 2010. Denitrification with fixed film suspended growth system, clarifiers and aerobic sludge digestion, UV. DMR data from winter quarter shows 11 mg/l TN and 1 mg/l TP. 2008-2010 showed avg. TN of 14 mg/l TN and 4 mg/l TP.
Columbia Falls	Columbia Falls already meets variance level standards. Actual cost of \$3,927,688
Havre	Discharges into the Milk River. Permit renewed in 2011. Activated sludge facility with effluent chlorination. 2006-2010 data showed avg. TP of 3.4 (TN not required). 2011 DMR showed TN of 19.4 mg/l; Tp of 1.3 mg/l.
Lagoons	
Philipsburg	lagoon to simple mechanical system - ref: Gary Swanson, consulting engineer- 15TN, 2TP; Do we have actual costs for the upgrade?
Cut Bank	

Deer Lodge	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork
Glendive	Upgrade from a lagoon to mechanical plant - BNR or otherwise would result in > 2%MHI
Redlodge	Upgrade from a lagoon to mechanical plant - BNR or otherwise would result in >1.5% MHI

2% MHI information
draft numbers pending input

Flow Category	Community Population	Number of Households (Population / 2.5) based on 2000 Census	Median Household Income (2010) - countywide MHI. Recommend updating for service area.	Current average household sewer bill per year (2008 / 2011)
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> 1 MGD (1 mg/l TP; 10 mg/l TN)	27,544	10,012	\$45,594.00	\$216.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	37,280	14,614	\$47,065.00	\$372.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	28,190	12,337	\$52,317.00	\$265.44
> 1 MGD (1 mg/l TP; 10 mg/l TN)	33,525	14,041	\$40,055.00	\$360.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	108,623	28,290	\$40,130.00	\$152.14
> 1 MGD (1 mg/l TP; 10 mg/l TN)	82,178	23,998	\$40,434.00	\$187.20
> 1 MGD (1 mg/l TP; 10 mg/l TN)	104,170	41,841	\$45,004.00	\$218.28

> 1 MGD (1 mg/l TP; 10 mg/l TN)	7414	2965.6	35,689	\$600.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	9500	3800	37,554	\$236.10
> 1 MGD (1 mg/l TP; 10 mg/l TN)	5,200	2080	25,161	\$276.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	5,813	2,325	31,729	\$387.60

Facilities with

Yes	1,520	523	\$50,729	\$362.40
Yes- but Columbia Falls already meets it	4,688	1,621	\$38,750	\$532.20
	10,325.00	4130	\$38,082	240.00

Yes.	820	399	35806.00	200
Yes	2,869	1,290	\$29,000	\$138.48

Yes	3,111	1,522	\$40,320	\$409.56
	4621.00	1848.40	37000.00	213.96
	9,756.00	3,902	\$40,379	305.28

Current average sewer fee as % of MHI	Notes	Capital cost (million dollars) to meet the approximate variance levels (WERF)	Annual Capital cost to meet the approximate variance levels (L4 WERF)
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> 1 MGD

0.47%	Already meeting variance levels. Sewer rates obtained from City in 2011. Plant ~WERF Level 2.	\$0.00	\$0.00
0.79%	Already meeting variance levels. Sewer rates obtained from City in 2011. Plant ~WERF Level 2. Really Level 3 for TN and 1 for TP	\$0.00	\$0.00
0.51%	Sewer rates obtained from City in 2011. Plant ~ WERF Level 1.	\$18.36	\$1,472,472.00
0.90%	Will already meet variance levels after upgrade. While current monthly fee is \$13.50, the \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP would raise rates to \$30 per month	\$27.00	\$2,165,400.00
0.38%	Already meets variance levels	\$0.00	\$0.00
0.46%	and Great Falls (treatment levels, cost, etc.) were obtained from HDR.	\$85.00	\$6,817,000.00
0.49%	and Great Falls (treatment levels, cost, etc.) were obtained from HDR.	\$85.00	\$6,817,000.00

1.68%		17.00	1,363,400.00
0.63%		22.20	1,780,440.00
1.10%		5.00	793,980.00
1.22%		1.00	200,500.00

Facilities with < 1MGD

0.71%	Mainly designed to remove ammonia and some TN, but now have NO3 limit. May be able to meet with operational changes. TP of 2 mg/l may require more capital & O&M expenses. Ref: planning document, SRF loan application	\$7.56	\$606,312.00
1.37%	Upgrade to an existing Chemical P-removal plant - actual effluent concentrations are 4 TN and 0.05TP-- already included in current fee	\$0.00	\$0.00
0.63%	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$26.40	\$2,117,280.00

Lagoons

0.56%	lagoon to simple mechanical system - ref: Gary Swanson, consulting engineer- 15TN, 2TP	\$0.68	\$54,536.00
0.48%	4000 gallons. Base rate \$9.48 at 3000 gallons plus \$2.06 for next 1,000 gallons	#REF!	\$1,018,540.00

1.02%		\$15.25	\$1,261,145.00
0.58%		\$10.00	\$802,000.00
	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$10.00	\$802,000.00

Annual Operations costs to meet the approximate variance levels L4WERF	Annual Capital and Operations cost (\$)	Annual Additional Cost per Household (increase in sewer rate)	Predicted average household sewer fee to meet criteria	Expected % MHI to Meet Variance Numbers (plus current wastewater fees)
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0.00	\$0.00	\$0.00	\$216	0.47
0.00	\$0.00	\$0.00	\$372	0.79
109,500.00	\$1,581,972.00	\$128.23	\$394	0.75
1,125,000.00	\$3,290,400.00	\$234.34	\$594	1.48
\$0.0	\$0.00	\$0.00	\$152	0.38
\$949,000.0	\$7,766,000.00	\$323.61	\$511	1.26
\$949,000.0	\$7,766,000.00	\$185.61	\$404	0.90

\$73,000.00	\$1,436,400.00	\$484.35	\$1,084	3.04
\$459,900.00	\$2,240,340.00	\$589.56	\$826	2.20
\$238,000.00	\$1,031,980.00	\$496.14	\$772	3.07
\$150,000.00	\$350,500.00	\$150.74	\$538	1.70

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	100,000.00	\$706,312.00	\$1,350.50	\$1,713	3.38	
	0.00	\$0.00	\$0.00	\$532	1.37	
	643860	\$2,761,140.00	\$668.56	\$909	2.39	

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	7,300.00	\$61,836.00	\$154.98	\$355	0.99	
	7,300.00	\$1,025,840.00	\$795.22	\$934	3.22	

602,000.00	\$1,863,145.00	\$1,224.14	\$1,634	4.05
300,000.00	\$1,102,000.00	\$596.19	\$810	2.19
300,000.00	\$1,102,000.00	\$282.39	\$588	1.46

	Percent increase in Wastewater bill	2% MHI	Total additional annual amount town would spend total to get to 2% MHI	
	0%	\$911.88	\$6,967,150.56	\$6,967,150.56
	0%	\$941.30	\$8,319,750.20	\$8,319,750.20
	48%	\$1,046.34	\$9,633,963.30	\$9,633,963.30
	65%	\$801.10	\$6,193,485.10	\$6,193,485.10
	0%	\$802.60	\$18,401,513.40	\$18,401,513.40
	173%	\$808.68	\$14,914,277.04	\$14,914,277.04
	85%	\$900.08	\$28,527,193.80	\$28,527,193.80

	81%		
	373%		
		\$1,014.58	\$341,090.14
	0%		
		\$775.00	\$393,578.80
	279%		
	77%		
		\$716.12	\$205,931.88
	574%		
		\$580.00	\$569,560.80

299%		
	\$806.40	\$603,990.48

WERF

Level	Description	Capital Cost (\$/gpd)	Operations (\$1,000/yr/10 MG Treated)
Level 1	No N and P removal	9.3	250
Level 2	1 mg/l TP; 8 mg/l TN	12.7	350
Level 3	0.1-0.3 mg/l TP; 4-8 mg/l TN	14.4	640
Level 4	<0.1 mg/l TP; 3 mg/l TN	15.3	880
Level 5	<0.01 mg/l TP; 1 mg/l TN	21.8	1370

Costs to Meet Criteria	Capital Cost(\$million/MGD)	Design Flow	Facility Upgrade Capital Costs (\$million)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)
Kalispell	0	5.4	\$0.00	\$0.00
Bozeman	0	13.8	\$0.00	\$0.00
Helena	3.4	5.4	\$18.36	\$1.47
Butte	Actual Costs		1	\$27.00
Missoula				\$2.17
Great Falls	3.4	25	\$85.00	6.817
Billings	3.4	25	\$85.00	\$6.82
Livingston	3.4	5	\$17.00	1.3634
Miles City	6	3.7	\$22.20	1.78044
Hamilton	5	1.98	\$9.90	0.79398
Lewistown	1	2.5	\$2.50	0.2005
Manhattan				
Columbia Falls	Actual Costs	0.766	\$3,927,688.00	\$315,000.58
Havre	6	4.4	\$26.40	2.11728
Philipsburg	3.4	0.2	\$0.68	\$0.05
Cut Bank				
Deer Lodge				
Glendive	10		\$10.00	0.802
Red Lodge				

Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)	Operations (\$1/ MG/day Treated)	Operations Costs (\$/ year/ 1 MGD)	Actual Flow	Facility Upgrade Operations Costs (\$/year/1 MGD) based on Facility MGD	Membrane Replacement Cost (\$24,000 /yr/1 MGD)*Actual Flow - not necessary b/c no RO
\$0.00	0	0.00	3.10	0.00	0.00
\$0.00	0	0.00	5.80	0.00	0.00
\$1,472,472.00	100	36,500.00	3.00	109,500.00	0.00
\$2,165,400.00	0	0.00	4.00	1,125,000.00	0.00
\$6,817,000.00	100	36,500.00	26	949,000.00	0.00
\$6,817,000.00	100	36,500.00	26.00	949,000.00	0.00
\$1,363,400.00	100	36,500.00	2.00	73,000.00	0.00
\$1,780,440.00	630	229,950.00	2	459,900.00	0.00
\$793,980.00		350,000	0.68	238,000.00	
\$200,500.00		100,000.00	1.5	150,000.00	

\$315,000.58	0	0.00	0.37	0.00	0.00
\$2,117,280.00	630	229,950.00	2.8	643,860.00	0.00
\$54,536.00	100	36,500.00	0.20	7,300.00	0.00

\$802,000.00		300,000		300,000	
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Total Operations costs including membrane replacement
0.00
0.00
109,500.00
1,125,000.00
\$949,000.00
949,000.00
\$73,000.00
\$459,900.00
238,000.00
150,000.00

\$0.00
\$643,860.00
7,300.00

300,000

	Community	Median Household Income (2010) - countywide MHI. Recommend updating for service area.	Population	Estimated Number of Households (Population / 2.5) based on 2000 Census	Current Average Annual Household Wastewater Bill	Design Flow (MGD)	Actual Flow (MGD)	Current wastewater MHI	Percent MHI needed to get to RO/Base Numeric Nutrient Criteria (including current fees)
	Kalispell	\$39,953.00	19,927	7,705	\$216.00	5.4	3.10	0.54%	#REF!
	Bozeman	\$41,661.00	37,280	14,614	\$372.00	13.8	5.80	0.89%	#REF!
	Helena	\$47,152.00	28,190	12,337	\$265.44	5.4	3.00	0.56%	#REF!
	Butte	\$37,335.00	33,525	14,041	\$360.00	8.5	4.00	0.96%	#REF!
	Billings	\$45,004.00	104,170	41,841	\$218.28	26	26	0.49%	#REF!
	Missoula	\$34,319.00	66,788	27,553	\$152.14	12	9	0.44%	#REF!
	Great Falls	\$40,718.00	58,505	23,998	\$187.20	26	26	0.46%	#REF!
	Livingston	\$35,689.00	7,044	3,188	\$600.00	5	2	1.68%	#REF!
	Miles City	\$37,554.00	8,410	3,518	\$236.10	3.7	2	0.63%	#REF!

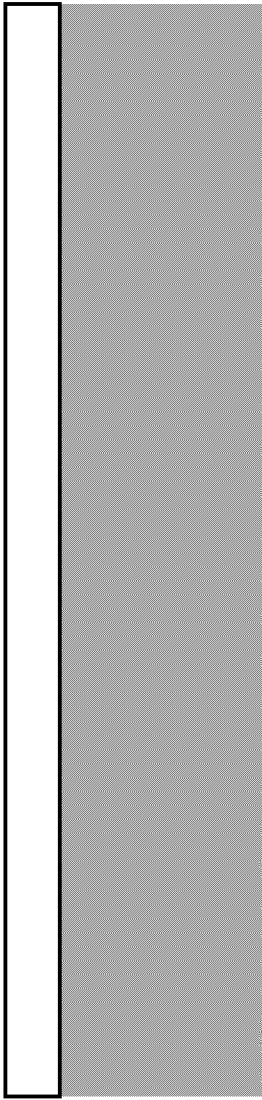
	Lewistown	\$31,729.00	5,901	2,727	\$387.60	2.5	1.5	1.22%	#REF!

	Havre	\$43,577.00	9,310	3,709	\$240.00	1.8	1	0.55%	#REF!
	Columbia Falls	\$38,750.00	4,688	1,621	\$532.20	0.766	0.37	1.37%	#REF!
	Manhattan	\$50,729.00	1,520	523	\$362.40	0.6	0.4	0.71%	#REF!
	Lolo	\$46,442.00	3,892	1,060	\$363.00	0.34	0.38	0.78%	#REF!
	Stevensville	\$33,776.00	1,809	795	\$535.08	0.3	0.29	1.58%	#REF!

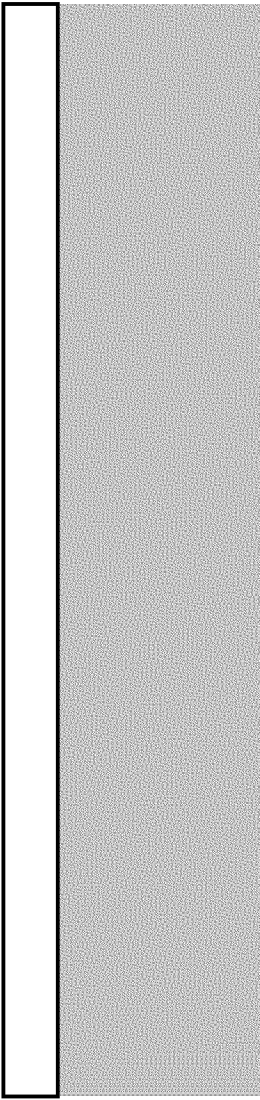
	Philipsburg	\$31,375.00	820	399	\$200.00	0.2		0.64%	#REF!
							0.2		
	Cut Bank	\$44,833.00	2,869	1,290	\$138.48	0.643	0.643	0.31%	#REF!
	Deer Lodge	\$40,320.00	3,111	1,522	\$409.56	3.3		1.02%	#REF!
	Glendive	\$42,821.00	4935	1,883	\$213.96	1.3	N/A	0.50%	#REF!

	Highwood	\$62,614.00	176	53	\$600.00	0.026		0.96%	#REF!
	Circle	\$29,000.00	615	234	\$259.56	0.16	0.015 0.065	0.90%	#REF!

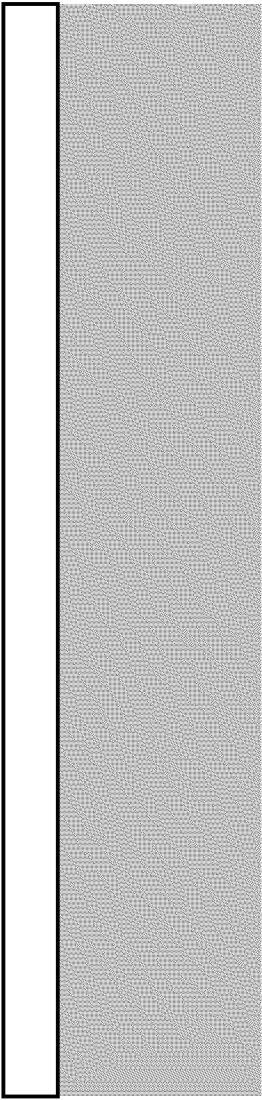
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Yellow fill = Greater than 2% MHI to reach to certain level of wastewater treatment



Orange fill = Greater than 100% increase in wastewater fee costs to reach to certain level of w



Blue Fill = Town already meets the standard so no new costs or treatment needed

Increase over current Wastewater Bill to Reach RO	Percent MHI needed to get to Variance in SB367 (including current fees)	Increase over current Wastewater Bill to Reach Variance	2% MHI per household	Total additional <u>annual</u> amount Town Would Need to Spend to get to 2% MHI
#REF!	0.47%	0%	\$799	\$4,492,477
#REF!	0.79%	0%	\$833	\$6,740,269
#REF!	0.75%	48%	\$943	\$8,359,551
#REF!	1.48%	65%	\$747	\$5,429,655
#REF!	0.90%	85%	\$900	\$28,527,194
#REF!	N/A	N/A	\$686	\$14,719,915
#REF!	1.26%	173%	\$814	\$15,050,586
#REF!			\$714	\$362,731
#REF!			\$751	\$1,811,700

#REF!

\$503

\$475,344

#REF!

\$635

\$673,514

#REF!				
#REF!	1.37%	0%	\$872	\$2,342,382
#REF!	3.38%	373%	\$775	\$393,579
#REF!			\$1,015	\$341,090
#REF!				

#REF!	0.99%	77%		
#REF!	3.22%	574%	\$628	\$170,573
#REF!	4.05%	299%	\$897	\$978,052
#REF!			\$806	\$603,990
#REF!			\$856	\$1,209,752

#REF!

\$1,002

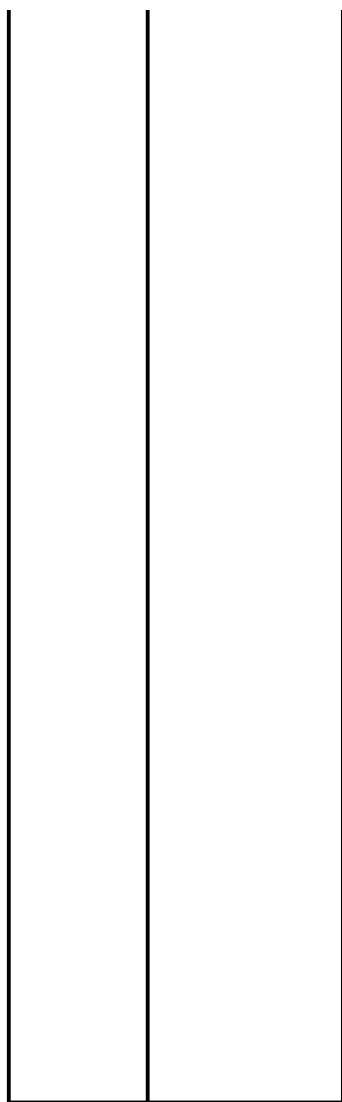
\$735,525

#REF!

\$888

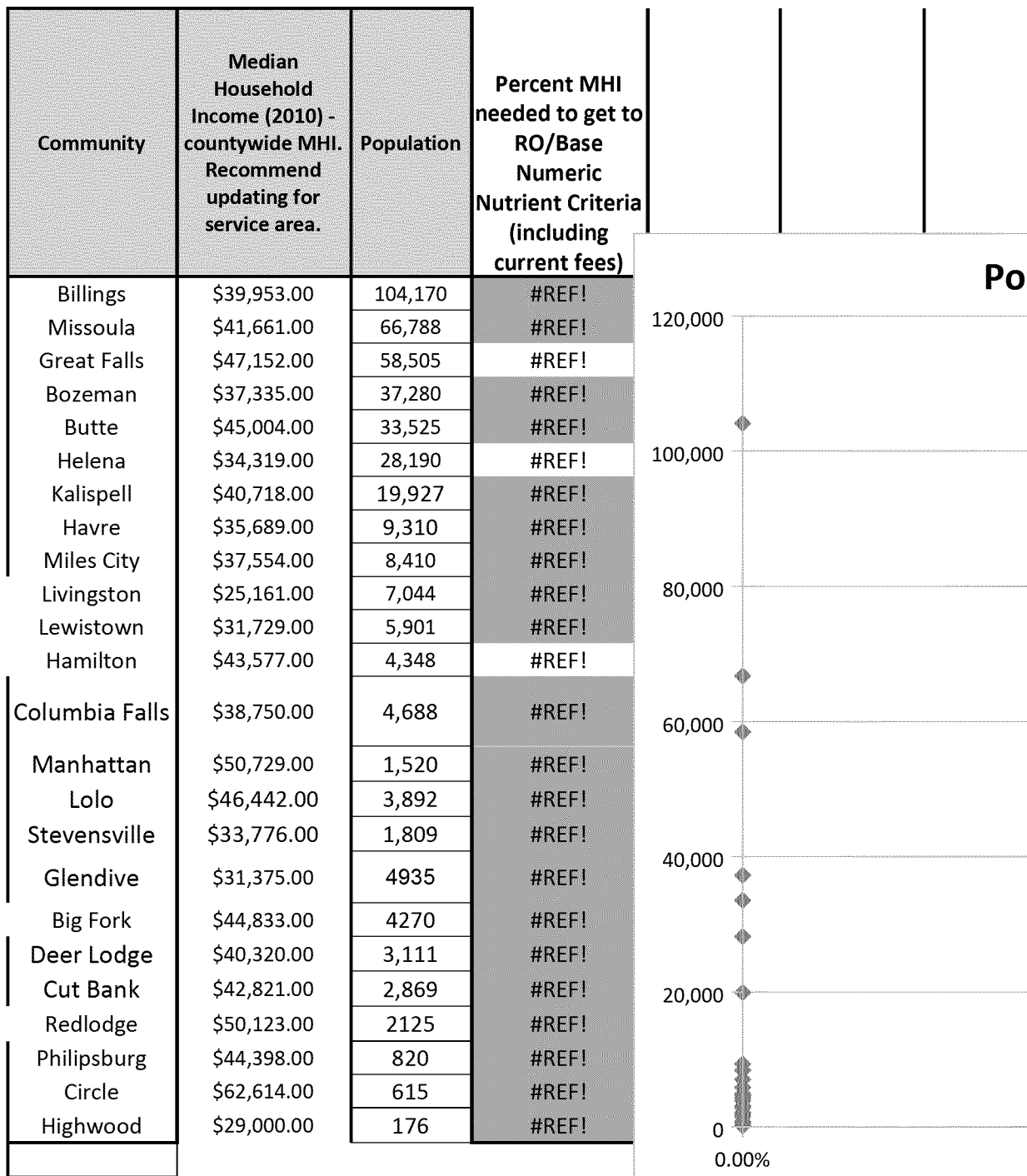
\$525,381

#REF!				
#REF!			\$1,252 \$580	\$34,571 \$74,983



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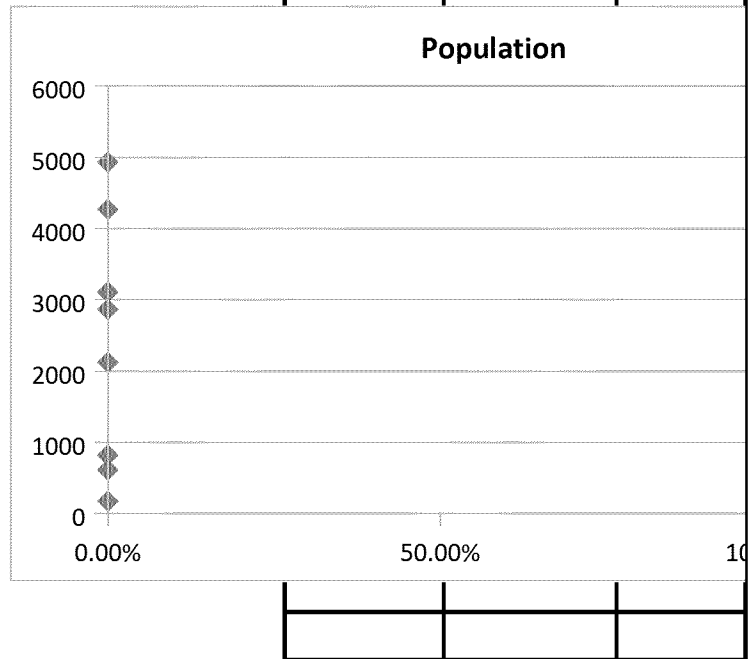
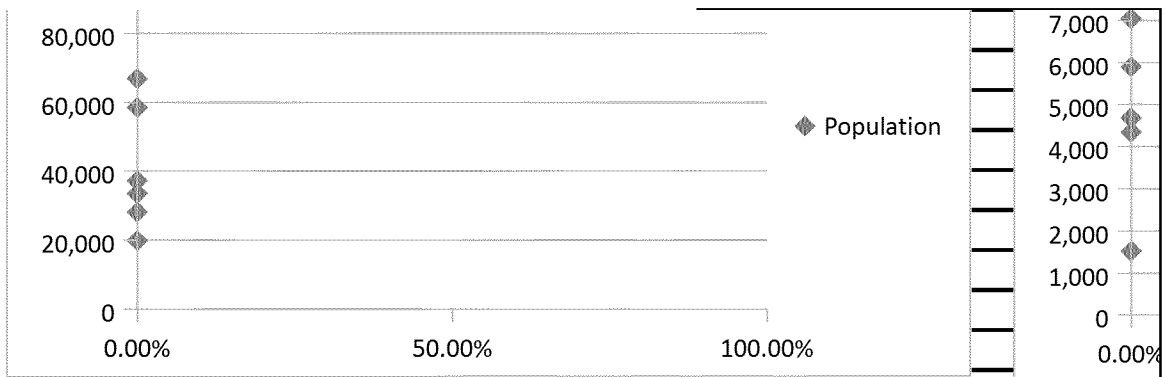


Yellow fill = Greater than 2% MHI to reach to certain level of wastewater treatment

Orange fill = Greater than 100% increase in wastewater fee costs to reach to certain level of waste

Blue Fill = Town already meets the standard so no new costs or treatment needed



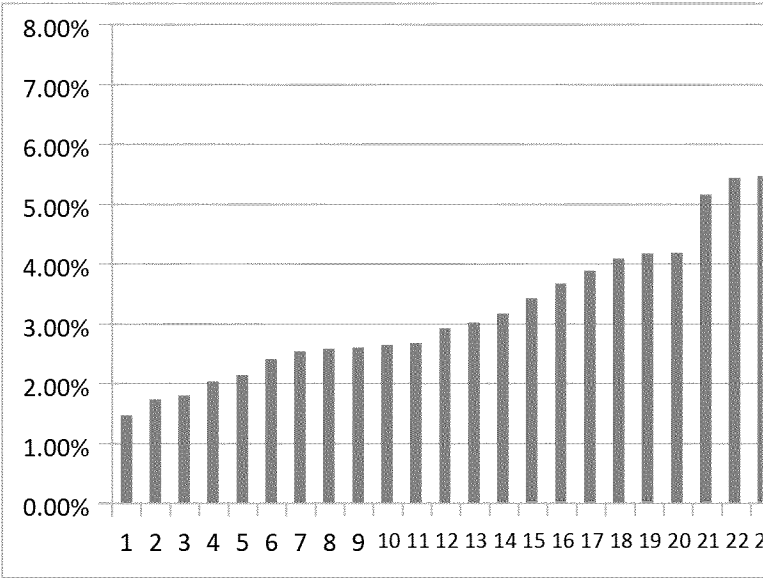


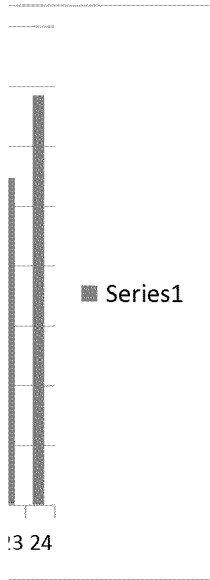
Population vs Percent MHI Needed to Reach Base Criteria

Population vs. %MHI--Other Non lagoons							
water treatment							

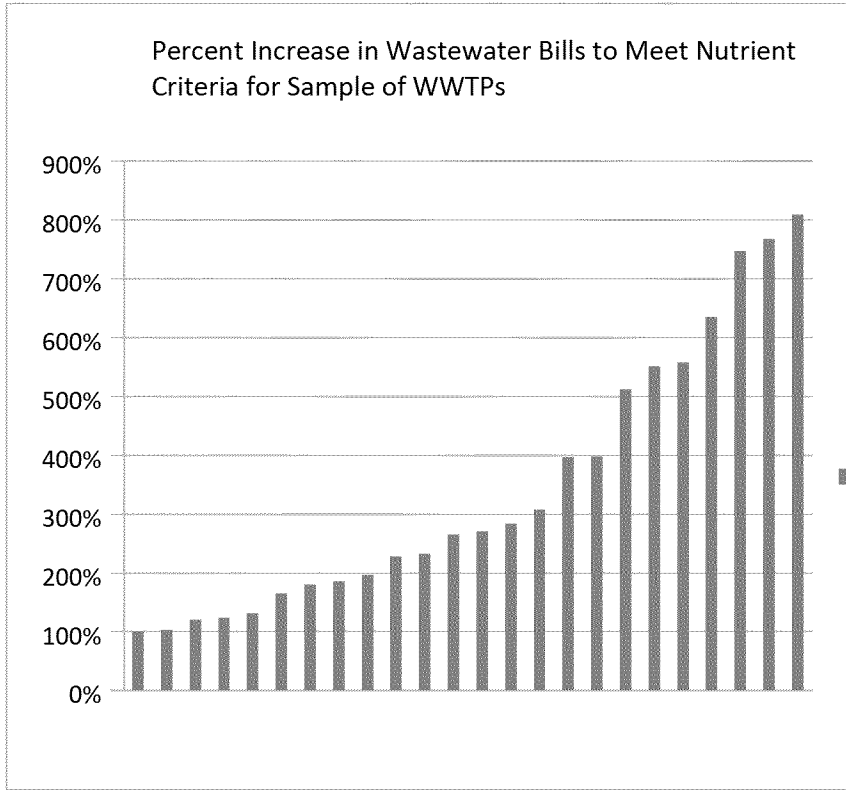
1.47%
1.74%
1.81%
2.04%
2.15%
2.41%
2.54%
2.58%
2.60%
2.65%
2.68%
2.92%
3.02%
3.17%
3.43%
3.67%
3.89%
4.09%
4.18%
4.19%
5.16%
5.44%
5.47%
6.85%

Total MHI% to meet nutrient criteria





- 100%
- 103%
- 120%
- 123%
- 131%
- 165%
- 180%
- 186%
- 196%
- 228%
- 232%
- 264%
- 270%
- 283%
- 307%
- 396%
- 398%
- 511%
- 551%
- 557%
- 635%
- 747%
- 767%
- 808%





Community	Current Treatment Technology	Design Flow (MGD)	Actual Flow (MGD)	Capital cost (million dollars) to meet the numeric nutrient criteria (WERF)	Annual Capital cost to meet the numeric nutrient criteria (L4 WERF)
Big 7 Communities					
Kalispell	BNR (modified Johannesburg); 3.1 to 5.4 MGD; ~WERF Level 2--avg. .12 mg/l TP; 10 mg/l TN.	5.4	3.10	#REF!	#REF!
Bozeman	Some BNR now; 5-stage Barrdenpho; new plant will be ~WERF Level 2 on average--BNR (1 mg/l TP; 3 mg/l TN starting 2011); current 5.8 mgd; increasing to 13.9 mgd	13.8	5.80	#REF!	#REF!
Helena	BNR; ~ WERF Level 1--3 mg/l TP; 10 mg/l TN; design capacity of 5.4; current discharge ~3.0 MGD	5.4	3.00	#REF!	#REF!
Butte	Current technology is activated sludge (TN of 18.5 mg/l; TP of 2.11 mg/l); under Order to Construct to membrane BNR; current design is 8.5 MGD. Included in current fee is \$27 million upgrade in new capital costs and \$1.125 million in O&M costs which would bring them to 5 TN and 0.1 TP or ~WERF Level 3	8.5	4.00	#REF!	#REF!
Billings	Secondary treatment; Design flow of 26 MGD (avg.) and 40 MGD max. Costs are estimated from HDR.	26	26	312.50	#REF!
Missoula	Already meets nutrient criteria in Clark Fork with mixing zone. Advanced secondary treatment facility with biological nutrient removal and ultraviolet disinfection. 8.2 mg/l TN; 0.16 -0.4 mg/l TP; get a mixing zone, meeting criteria currently. BNR. Design flow = 12 MGD ; actual flow = 9 MGD. (designed for 10 and 1). (HDR)	12	9	#REF!	#REF!
Great Falls	At WERF 1. Conventional Secondary activated sludge (max 21-MGD; avg. 10 MGD). Cost data from HDR.	26	26	312.50	#REF!
Other Large Communities > 1 MGD					
Livingston	Assume WERF Level 1. Discharges into the Yellowstone; permit renewed in 2010; mechanical plant w/ 2 primary clarifiers, 3 rotating biological contactors, UV, installing co-composting. DMR shows 11 mg/l TN average (20 mg/l for May) and 2 mg/l TP (3 mg/l for May).	5	2	#REF!	#REF!

Miles City	Assume WERF 1. Secondary treatment plus oxidation ditch. 2011 permit. Algae plant study to remove nutrients. Extended aeration system w/2 oxidation ditches w/rotating brush aerators; 2 clarifiers and chlorine basin. TN avg of 23.5 mg/l; TP avg. 3.6 mg/l.	3.7	2	#REF!	#REF!
Hamilton	Assume WERF 2 (TN WERF 3 and TP WERF 1). BNR facility w/ extended aeration system. Oxidation ditch w/ rotating brush aerators. 3 clarifiers. Upgraded in 2010. TN avg. 5.5 mg/l; TP avg. 5 mg/l.	1.98	0.68	24.75	#REF!
Lewistown	Assume WERF 3 based on current levels. BNR plant. Focus on TP removal. 0.8 mg/l TP; 3-4 mg/l TN.	2.5	1.5	18.50	#REF!
Havre	Assumed WERF Level 1. Discharges into the Milk River. Permit renewed in 2011. Activated sludge facility with effluent chlorination. 2006-2010 data showed avg. TP of 3.4 (TN not required). 2011 DMR showed TN of 19.4 mg/l; Tp of 1.3 mg/l.	1.8	1.38	#REF!	#REF!
Non-Lagoon Facilities with < 1MGD					
Columbia Falls	Assume WERF Level 3. Newer plant with good control. Designed to achieve 8 mg/l TN	0.766	0.37	\$0.00	\$0
Manhattan	Assumed WERF Level 2. Discharges into Diva Ditch. Permit renewed in 2010. Denitrification with fixed film suspended growth system, clarifiers and aerobic sludge digestion, UV. DMR data from winter quarter shows 11 mg/l TN and 1 mg/l TP. 2008-2010 showed avg. TN of 14 mg/l TN and 4 mg/l TP.	0.6	0.4	\$0.00	\$0
Lolo	WERF Level 1. No steps towards nutrient removal. For Lolo, TN is generally less than 30 mg/l and TP less than 7. Generally heaving loadings for Lolo. Sewer rates--Lolo \$30.25-ish/mo - (RSID) based on property values	0.34	0.38	\$1.73	\$139,067
Stevensville	WERF Level 1. TN generally below 20 and TP less than 4.	0.3	0.29	\$1.53	\$122,706

Lagoons					
Philipsburg	WERF 1--Lagoon - ref: Gary Swanson, consulting engineer- 15TN, 2TP	0.2	0.2	#REF!	#REF!
Cut Bank	WERF 0--Lagoon.	0.643	0.643	#REF!	#REF!
Deer Lodge	WERF Level 0. Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork	3.3	1.06	#REF!	\$1,261,145.00
Glendive	WERF Level 0. Domestic WW lagoon; 3 cell facultative; current O&M costs are <\$; 8-10 capital costs for new plant. O&M increase of ~\$300,000. new avg. 1.15 MGD; PER completed to upgrade to mechanical SBR or BNR plant.	1.3	0.6	#REF!	#REF!
Red Lodge	WERF Level 0--Lagoon.	1.2	0.65	#REF!	#REF!
Big Fork	WERF Level 0--Lagoon.	0.5	0.3	#REF!	#REF!
Highwood	WERF Level 0--Lagoon.	0.026	0.015	#REF!	#REF!
Circle	WERF Level 0--Lagoon.	0.16	0.065	#REF!	#REF!

NOTE: Operation costs include energy and chemical costs only and do not include labor and maintenance cost. A

NOTE: The numbers are intended to provide ROUGH ESTIMATES for discussion purposes and do not reflect the s

NOTE: Capital costs were assumed to cover a 20-year bond with 5% interest (used 0.0802 conversion factor)

NOTE: MHI is based on data from Montana CEIC based on 2010 estimates.



Indicates rough estimates; need to verify

Big Fork number of household based on population divided by 2.5

	Annual Operations costs to meet the numeric nutrient criteria L4WERF	Annual Capital and Operations cost (\$)	Annual Additional Cost per Household (increase in sewer rate)	Predicted average household sewer fee to meet criteria	Expected % MHI to Meet Base Numeric Nutrient Criteria (plus current wastewater fees)	Percent increase in Wastewater bill
7 Communities						
	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
Communities > 1 MGD						
	\$865,600	#REF!	#REF!	#REF!	#REF!	#REF!

#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!

on Facilities with < 1MGD

#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!

Lagoons

#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!

s such, these numbers are on the low side.
ite-specific conditions at each plant.

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265-6719 - City Office

Community	Current Treatment Technology	Would the criteria apply? Or is there dilution capability?	Design Flow (MGD)	Actual Flow (MGD)	Community Population (Census 2010)	Number of Households (American Community Survey 2005-2009)
Big 7 Communities						
Kalispell	BNR (modified Johannesburg); 3.1 to 5.4 MGD; avg. .12 mg/l TP; 10 mg/l TN.	Yes. EOP; Ashley Creek	5.4	3.10	19,927	7,705
Bozeman	some BNR now; 5-stage Barrdenpho; new plant will be BNR (1 mg/l TP; 3 mg/l TN starting in 2011); current 5.8 MGD; increasing to 13.9 mgd	Yes. Also Gallatin TMDL in the works.	13.8	5.80	37,280	14,614
Helena	BNR; 3 mg/l TP; 10 mg/l TN; design capacity of 5.4; current discharge ~3.0 MGD	Yes. WLA set in TMDL based on numeric criteria.	5.4	3.00	28,190	12,337
Butte	Current technology is activated sludge (TN of 18.5 mg/l; TP of 2.11 mg/l); under Order to Construct to membrane BNR; current design is 8.5 MGD; talking about lowering to 6.1 MGD. Sewer Fee based on DEQ estimates. Included in current fee is \$27 million upgrade in new capital costs and \$1.125 million in O&M costs which would bring them to 5 TN and 0.1 TP	Yes. EOP.	8.5	4.00	33,525	14,041
Billings	2ndary treatment; Design flow of 26 MGD (avg.) and 40 MGD max.	Yes. Discharge into the Yellowstone River.	26	26	104,170	41,841
Missoula	advanced secondary treatment facility with biological nutrient removal and ultraviolet disinfection; meets Clark Fork criteria w/ mixing zone. 8.2 mg/l TN; 0.16 -0.4 mg/l TP; get a mixing zone, meeting criteria currently. BNR. Design flow = 12 MGD ; actual flow = 9 MGD. (designed for 10 and 1). (HDR)	Yes. With mixing zone. Currently meeting criteria after mixing zone.	12	9	66,788	27,553

Great Falls	conventional 2ndary activated sludge (max 21-MGD; avg. 10 MGD)	Yes. Missouri River	26	26	58,505	23,998
Other Large Communities > 1 MGD						
Livingston	discharges into the Yellowstone; permit renewed in 2010; mechanical plant w/ 2 primary clarifiers, 3 rotating biological contactors, UV, installing co-composting. DMR shows 11 mg/l TN average (20 mg/l for May) and 2 mg/l TP (3 mg/l for May).	Yes. Discharge into the Yellowstone River.	5	2	7,044	3,188
Miles City	2ndary treatment plus oxidation ditch. 2011 permit. Algae plant study to remove nutrients. Extended aeration system w/2 oxidation ditches w/rotating brush aerators; 2 clarifiers and chlorine basin. TN avg of 23.5 mg/l; TP avg. 3.6 mg/l.	Yes. Discharge into the Yellowstone River.	3.7	2	8,410	3,518
Hamilton	BNR facility. t w/ extended aeration system. Oxidation ditch w/ rotating brush aerators. 3 clarifiers. Upgraded in 2010. TN avg. 5.5 mg/l; TP avg. 5 mg/l.	Yes	1.98	0.68	4,348	2,092
Lewistown	BNR plant. Focus on TP removal. 0.8 mg/l TP; 3-4 mg/l TN.	Yes	2.5	1.5	5,901	2,727
Havre	Discharges into the Milk River. Permit renewed in 2011. Activated sludge facility with effluent chlorination. 2006-2010 data showed avg. TP of 3.4 (TN not required). 2011 DMR showed TN of 19.4 mg/l; Tp of 1.3 mg/l.	Yes	1.8	1.38	9,310	3,709
Non-Lagoon Facilities with < 1MGD						
Columbia Falls	Newer plant. Designed to achieve 8 mg/l TN	Yes	0.766	0.37	4,688	1,621

Manhattan	Discharges into Diva Ditch. Permit renewed in 2010. Denitrification with fixed film suspended growth system, clarifiers and aerobic sludge digestion, UV. DMR data from winter quarter shows 11 mg/l TN and 1 mg/l TP. 2008-2010 showed avg. TN of 14 mg/l TN and 4 mg/l TP.	Yes	0.6	0.4	1,520	523
Lolo	No steps towards nutrient removal. For Lolo, TN is generally less than 30 mg/l and TP less than 7. Generally heaving loadings for Lolo. Sewer rates--Lolo \$30.25-ish/mo - (RSID) based on property values	Yes	0.34	0.38	3,892	1,060
Stevensville	Stevensville is generally a little better with TN generally below 20 and TP less than 4.	Yes	0.3	0.29	1,809	795
Lagoons						
Philipsburg	lagoon - ref: Gary Swanson, consulting engineer- 15TN, 2TP	Yes.	0.2	0.2	820	399
Cut Bank	Lagoon.	Yes	0.643	0.643	2,869	1,290
Deer Lodge	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork	Yes	3.3	1.06	3,111	1,522
Glendive	domestic WW lagoon; 3 cell facultative; current O&M costs are <\$; 8-10 capital costs for new plant. O&M increase of ~\$300,000. new avg. 1.15 MGD; PER completed to upgrade to mechanical SBR or BNR plant.	Yes	1.3	0.6	4935	1883

Median Household Income (2010) - American Community Survey.	Current average household sewer bill per year (2008 / 2011)	Current average sewer fee as % of MHI	Notes	Capital cost (million dollars) to meet the numeric nutrient criteria (WERF)	Annual Capital cost to meet the numeric nutrient criteria (L4 WERF)	Annual Operations costs to meet the numeric nutrient criteria L4WERF	Annual Capital and Operations cost (\$)
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Big 7 Communities

\$39,953.00	\$361.68	0.91%	Sewer rates obtained from City in 2011. Plant ~WERF Level 2. \$30.14/month Based on a base rate of \$15.00 with a usage rate of \$4.19/1000 gal of water used	49.14	\$3,941,028	\$1,228,530	\$5,169,558
\$41,661.00	\$372.00	0.89%	Sewer rates obtained from City in 2011. Plant ~WERF Level 2. Really Level 3 for TN and 1 for TP	125.58	\$10,071,516	\$2,298,540	\$12,370,056
\$47,152.00	\$277.80	0.59%	Sewer rates obtained from City in 2011. Plant ~ WERF Level 1.	67.50	\$5,413,500	\$1,298,400	\$6,711,900
\$37,335.00	\$360.00	0.96%	Sewer Fee based on DEQ estimates. While current monthly fee is \$13.50, the \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP (WERF 3) would raise rates to \$30 per month	62.90	\$5,044,580	\$1,161,800	\$6,206,380
\$45,004.00	\$218.28	0.49%	The numbers for Billings and Great Falls (treatment levels, treatment costs etc.) were obtained from HDR.	312.50	\$25,062,500	\$11,252,800	\$36,315,300
\$34,319.00	\$152.14	0.44%	Sewer rates obtained from city. 2011 values.	88.80	\$7,121,760	\$2,614,050	\$9,735,810

\$40,718.00	\$187.20	0.46%	At WERF 1. The numbers for Billings and Great Falls (population, treatment levels, etc.) were obtained from HDR.	312.50	\$25,062,500	\$11,252,800	\$36,315,300
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Other Large Communities > 1 MGD

\$35,689.00	\$600.00	1.68%	Assume WERF Tier 1	62.50	\$5,012,500	\$865,600	\$5,878,100
\$37,554.00	\$236.10	0.63%	Assume WERF Tier 1	46.25	\$3,709,250	\$865,600	\$4,574,850
\$25,161.00	\$276.00	1.10%	Assume WERF 2 (since TN gets to WERF 3 and TP WERF 1)	24.75	\$1,984,950	\$301,984	\$2,286,934
\$31,729.00	\$387.60	1.22%	Assume WERF 3 based on current treatment levels	18.50	\$1,483,700	\$423,675	\$1,907,375
\$43,577	\$240.00	0.55%	Assumed WERF Level 1 and 5,000 gallons usage. Rate is \$9.15 flat plus \$2.15 per 1,000 gallons	\$22.50	\$1,804,500	\$597,264	\$2,401,764

Non-Lagoon Facilities with < 1MGD

\$38,750	\$532.20	1.37%	Upgrade to RO	\$5.67	\$454,606	\$580,900	\$1,035,506
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\$50,729	\$362.40	0.71%	Assumed WERF Level 2. Correct? Paul.	\$5.46	\$437,892	\$63,408	\$501,300
\$46,442	\$363.00	0.78%	Level 1.	\$4.25	\$340,850	\$164,464	\$505,314
\$33,776	\$535.08	1.58%		\$3.75	\$300,750	\$125,512	\$426,262

Lagoons

\$31,375.00	\$200.00	0.64%	Assume WERF 1	\$4.36	\$ 349,672.00	94,810.00	\$444,482.00
\$44,833	\$138.48	0.31%	4000 gallons. Base rate \$9.48 at 3000 gallons plus \$2.06 for next 1,000 gallons	\$14.02	\$ 1,124,195.48	246,140.40	\$1,370,335.88
\$40,320	\$409.56	1.02%	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork	\$71.94	\$1,261,145.00	\$502,493.00	\$1,763,638.00
\$42,821	\$213.96	0.50%		\$28.34	\$2,272,868.00	\$284,430.00	\$2,557,298.00

\$50,123	305.28	0.61%	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$26.16	\$2,098,032.00	\$308,132.50	\$2,406,164.50
\$44,398	580.36	1.31%		\$10.90	\$874,180.00	\$142,215.00	\$1,016,395.00
\$62,614	600.00	0.96%		\$0.57	\$45,457.36	\$7,110.75	\$52,568.11
\$29,000	259.56	0.90%		\$3.49	\$279,737.60	\$30,813.25	\$310,550.85

e.

Annual Additional Cost per Household (increase in sewer rate)	Predicted average household sewer fee to meet criteria	Expected % MHI to Meet Base Numeric Nutrient Criteria (plus current wastewater fees)	Percent increase in Wastewater bill		
\$671	\$1,033	2.58	186%		
\$846	\$1,218	2.92	228%		
\$544	\$822	1.74	196%		
\$442	\$802	2.15	123%		
\$868	\$1,086	2.41	398%		
\$353	\$505	1.47	232%		

	\$1,513	\$1,700	4.18	808%		
	\$1,844	\$2,444	6.85	307%		
	\$1,300	\$1,537	4.09	551%		
	\$1,093	\$1,369	5.44	396%		
	\$699	\$1,087	3.43	180%		
	\$648	\$888	2.04	270%		
					265-6719 - City Office	
	\$639	\$1,171	3.02	120%		

\$959	\$1,321	2.60	264%	
\$477	\$840	1.81	131%	
\$536	\$1,071	3.17	100%	

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\$1,113.99	\$1,314	4.19	557%
\$1,062.28	\$1,201	2.68	767%
\$1,158.76	\$1,568	3.89	283%
\$1,358.10	\$1,572	3.67	635%

\$2,280.72	\$2,586	5.16	747%		
\$595.08	\$1,175	2.65	103%		
\$991.85	\$1,592	2.54	165%		
\$1,327.14	\$1,587	5.47	511%		

WERF

Level	Description	Capital Cost (\$/gpd)	Operations (\$1/ MG/day Treated)
Level 1	No N and P removal	9.3	250
Level 2	1 mg/l TP; 8 mg/l TN	12.7	350
Level 3	0.1-0.3 mg/l TP; 4-8 mg/l TN	14.4	640
Level 4	<0.1 mg/l TP; 3 mg/l TN	15.3	880
Level 5	<0.01 mg/l TP; 1 mg/l TN	21.8	1370

Costs to Meet Criteria	Capital Cost(\$million/MGD)	Design Flow	Facility Upgrade Capital Costs (\$million)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)
Kalispell	9.1	5.4	\$49.14	\$3.94
Bozeman	9.1	13.8	\$125.58	\$10.07
Helena	12.5	5.4	\$67.50	\$5.41
Butte	7.4	8.5	\$62.90	\$5.04
Billings	12.5	25	\$312.50	\$25.06
Missoula	7.4	12	\$88.80	7.12176
Great Falls	12.5	25	\$312.50	25.0625
Livingston	12.5	5	\$62.50	\$5.01
Miles City	12.5	3.7	\$46.25	\$3.71
Hamilton	12.5	1.98	\$24.75	1.98495
Lewistown	7.4	2.5	\$18.50	1.4837
Havre	12.5	1.8	\$22.50	1.8045
Columbia Falls	7.4	0.766	\$5.67	0.45461
Manhattan	9.1	0.6	\$5.46	0.43789
Lolo	12.5	0.34	\$4.25	0.34085
Stephensville	12.5	0.3	\$3.75	0.30075
Philipsburg	21.8	0.2	\$4.36	\$0.35
Cut Bank	21.8	0.643	\$14.02	\$1.12
Deer Lodge	21.8	3.3	\$71.94	\$5.77
Glendive	21.8	1.3	\$28.34	2.27287
Red Lodge	21.8	1.2	\$26.16	2.09803
Big Fork	21.8	0.5	\$10.90	0.87418
Highwood	21.8	0.026	\$0.57	0.04546
Circle	21.8	0.16	\$3.49	0.27974

Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)	Operations (\$1/ MG/day Treated)	Operations Costs (\$/ year/ 1 MGD)	Actual Flow	Facility Upgrade Operations Costs (annual) based on Facility MGD	Membrane Replacement Cost (\$24,000 /yr/1 MGD)* Actual Flow
\$3,941,028.00	1020	372,300.00	3.10	1,154,130.00	74,400.00
\$10,071,516.00	1020	372,300.00	5.80	2,159,340.00	139,200.00
\$5,413,500.00	1120	408,800.00	3.00	1,226,400.00	72,000.00
\$5,044,580.00	730	266,450.00	4.00	1,065,800.00	96,000.00
\$25,062,500.00	1120	408,800.00	26.00	10,628,800.00	624,000.00
\$7,121,760.00	730	266,450.00	9.00	2,398,050.00	216,000.00
\$25,062,500.00	1120	408,800.00	26	10,628,800.00	624,000.00
\$5,012,500.00	1120	408,800.00	2.00	817,600.00	48,000.00
\$3,709,250.00	1120	408,800.00	2.00	817,600.00	48,000.00
\$1,984,950.00	1120	408,800.00	0.68	277,984.00	24,000.00
\$1,483,700.00	730	266,450.00	1.50	399,675.00	24,000.00
\$1,804,500.00	1120	408,800.00	1.38	564,144.00	33,120.00
\$454,605.68	730	266,450.00	2.00	532,900.00	48,000.00
\$437,892.00	1020	372,300.00	0.16	59,568.00	3,840.00
\$340,850.00	1120	408,800.00	0.38	155,344.00	9,120.00
\$300,750.00	1120	408,800.00	0.29	118,552.00	6,960.00
\$349,672.00	1370	450,050.00	0.20	90,010.00	4,800.00
\$1,124,195.48	1120	358,800.00	0.64	230,708.40	15,432.00
\$5,769,588.00	1370	450,050.00	1.06	477,053.00	25,440.00
\$2,272,868.00	1370	450,050.00	0.6	270,030.00	14,400.00
\$2,098,032.00	1370	450,050.00	0.65	292,532.50	15,600.00
\$874,180.00	1370	450,050.00	0.30	135,015.00	7,200.00
\$45,457.36	1370	450,050.00	0.015	6,750.75	360.00
\$279,737.60	1370	450,050.00	0.065	29,253.25	1,560.00

Total Operations costs including membrane replacement
1,228,530.00
2,298,540.00
1,298,400.00
1,161,800.00
11,252,800.00
2,614,050.00
\$11,252,800.00
\$865,600.00
\$865,600.00
301,984.00
423,675.00
\$597,264.00
\$580,900.00
\$63,408.00
\$164,464.00
\$125,512.00
\$94,810.00
\$246,140.40
\$502,493.00
\$284,430.00
\$308,132.50
\$142,215.00
\$7,110.75
\$30,813.25

Community	Current Treatment Technology
> 1 MGD	
Kalispell	Already below variance levels; achieving avg. 0.12 mg/l TP and 10 mg/l TN. Town expected to pay an addition \$6,967,150.56 annually to achieve 2% MHI.
Bozeman	Already below variance levels; should be close to achieving 1 mg/l TP and 3 -5 mg/l TN starting in 2011/2-12. Town expected to pay an additional \$8,319,750.2 annually to achieve 2% MHI.
Helena	After optimization study, should be achieving variance levels. Currently at 3 mg/l TP and 10 mg/l TN. Town expected to pay an additional \$9,633,963.3 annually to achieve 2%MHI.
Butte	Under Order to Construct to membrane BNR Will already meet variance levels after upgrade. The \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP. Upgrade would result in 1.5% MHI. Additional costs needed?
Missoula	Already meets Clark Fork criteria w/ mixing zone. Achieving 8.2 mg/l TN; 0.16 -0.4 mg/l TP. Would the town be expected to pay more (~\$18 million annually) towards 2% MHI or not since they are achieving the criteria?
Great Falls	Conventional 2ndary activated sludge (max 21-MGD; avg. 10 MGD). Based on Billings case study, likely long-term variance limits of Level 4 for WERF (0-.1 mg/l TP; 3 mg/l TN)
Billings	2ndary treatment; Design flow of 26 MGD (avg.) and 40 MGD max. Based on Billings case study, likely long-term variance limits of Level 4 for WERF (0-.1 mg/l TP; 3 mg/l TN)

Livingston	Based on existing high costs, likely that meeting 1 mg/l and 10 TN would be the feasible limits. MHI of 3.05 percent to achieve WERF level 3.
Miles City	2011 permit; calculated variance limits to <0.1 mg/l TP; 3 mg/l TN
Hamilton	BNR facility. t w/ extended aeration system. Oxidation ditch w/ rotating brush aerators. 3 clarifiers. Upgraded in 2010.
Lewistown	Already below variance levels;BNR plant. Lready below proposed interim effluent limits (0.8 mg/l TP; 3-4 mg/l TN).
Facilities with < 1MGD	
Manhattan	Discharges into Diva Ditch. Permit renewed in 2010. Denitrification with fixed film suspended growth system, clarifiers and aerobic sludge digestion, UV. DMR data from winter quarter shows 11 mg/l TN and 1 mg/l TP. 2008-2010 showed avg. TN of 14 mg/l TN and 4 mg/l TP.
Columbia Falls	Columbia Falls already meets variance level standards. Actual cost of \$3,927,688
Havre	Discharges into the Milk River. Permit renewed in 2011. Activated sludge facility with effluent chlorination. 2006-2010 data showed avg. TP of 3.4 (TN not required). 2011 DMR showed TN of 19.4 mg/l; Tp of 1.3 mg/l.
Lagoons	
Philipsburg	lagoon to simple mechanical system - ref: Gary Swanson, consulting engineer- 15TN, 2TP; Do we have actual costs for the upgrade?
Cut Bank	

Deer Lodge	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork
Glendive	Upgrade from a lagoon to mechanical plant - BNR or otherwise would result in > 2%MHI
Redlodge	Upgrade from a lagoon to mechanical plant - BNR or otherwise would result in >1.5% MHI

2% MHI information
draft numbers pending input

Flow Category	Community Population	Number of Households (Population / 2.5) based on 2000 Census	Median Household Income (2010) - countywide MHI. Recommend updating for service area.	Current average household sewer bill per year (2008 / 2011)
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> 1 MGD (1 mg/l TP; 10 mg/l TN)	27,544	10,012	\$45,594.00	\$216.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	37,280	14,614	\$47,065.00	\$372.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	28,190	12,337	\$52,317.00	\$265.44
> 1 MGD (1 mg/l TP; 10 mg/l TN)	33,525	14,041	\$40,055.00	\$360.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	108,623	28,290	\$40,130.00	\$152.14
> 1 MGD (1 mg/l TP; 10 mg/l TN)	82,178	23,998	\$40,434.00	\$187.20
> 1 MGD (1 mg/l TP; 10 mg/l TN)	104,170	41,841	\$45,004.00	\$218.28

> 1 MGD (1 mg/l TP; 10 mg/l TN)	7414	2965.6	35,689	\$600.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	9500	3800	37,554	\$236.10
> 1 MGD (1 mg/l TP; 10 mg/l TN)	5,200	2080	25,161	\$276.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	5,813	2,325	31,729	\$387.60

Facilities with

Yes	1,520	523	\$50,729	\$362.40
Yes- but Columbia Falls already meets it	4,688	1,621	\$38,750	\$532.20
	10,325.00	4130	\$38,082	240.00

Yes.	820	399	35806.00	200
Yes	2,869	1,290	\$29,000	\$138.48

Yes	3,111	1,522	\$40,320	\$409.56
	4621.00	1848.40	37000.00	213.96
	9,756.00	3,902	\$40,379	305.28

Current average sewer fee as % of MHI	Notes	Capital cost (million dollars) to meet the approximate variance levels (WERF)	Annual Capital cost to meet the approximate variance levels (L4 WERF)
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> 1 MGD

0.47%	Already meeting variance levels. Sewer rates obtained from City in 2011. Plant ~WERF Level 2.	\$0.00	\$0.00
0.79%	Already meeting variance levels. Sewer rates obtained from City in 2011. Plant ~WERF Level 2. Really Level 3 for TN and 1 for TP	\$0.00	\$0.00
0.51%	Sewer rates obtained from City in 2011. Plant ~ WERF Level 1.	\$18.36	\$1,472,472.00
0.90%	Will already meet variance levels after upgrade. While current monthly fee is \$13.50, the \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP would raise rates to \$30 per month	\$27.00	\$2,165,400.00
0.38%	Already meets variance levels	\$0.00	\$0.00
0.46%	and Great Falls (treatment levels, cost, etc.) were obtained from HDR.	\$85.00	\$6,817,000.00
0.49%	and Great Falls (treatment levels, cost, etc.) were obtained from HDR.	\$85.00	\$6,817,000.00

1.68%		17.00	1,363,400.00
0.63%		22.20	1,780,440.00
1.10%		5.00	793,980.00
1.22%		1.00	200,500.00

Facilities with < 1MGD

0.71%	Mainly designed to remove ammonia and some TN, but now have NO3 limit. May be able to meet with operational changes. TP of 2 mg/l may require more capital & O&M expenses. Ref: planning document, SRF loan application	\$7.56	\$606,312.00
1.37%	Upgrade to an existing Chemical P-removal plant - actual effluent concentrations are 4 TN and 0.05TP-- already included in current fee	\$0.00	\$0.00
0.63%	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$26.40	\$2,117,280.00

Lagoons

0.56%	lagoon to simple mechanical system - ref: Gary Swanson, consulting engineer- 15TN, 2TP	\$0.68	\$54,536.00
0.48%	4000 gallons. Base rate \$9.48 at 3000 gallons plus \$2.06 for next 1,000 gallons	\$21.80	\$1,018,540.00

1.02%		\$15.25	\$1,261,145.00
0.58%		\$10.00	\$802,000.00
	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$10.00	\$802,000.00

Annual Operations costs to meet the approximate variance levels L4WERF	Annual Capital and Operations cost (\$)	Annual Additional Cost per Household (increase in sewer rate)	Predicted average household sewer fee to meet criteria	Expected % MHI to Meet Variance Numbers (plus current wastewater fees)
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0.00	\$0.00	\$0.00	\$216	0.47
0.00	\$0.00	\$0.00	\$372	0.79
109,500.00	\$1,581,972.00	\$128.23	\$394	0.75
1,125,000.00	\$3,290,400.00	\$234.34	\$594	1.48
\$0.0	\$0.00	\$0.00	\$152	0.38
\$949,000.0	\$7,766,000.00	\$323.61	\$511	1.26
\$949,000.0	\$7,766,000.00	\$185.61	\$404	0.90

\$73,000.00	\$1,436,400.00	\$484.35	\$1,084	3.04
\$459,900.00	\$2,240,340.00	\$589.56	\$826	2.20
\$238,000.00	\$1,031,980.00	\$496.14	\$772	3.07
\$150,000.00	\$350,500.00	\$150.74	\$538	1.70

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	100,000.00	\$706,312.00	\$1,350.50	\$1,713	3.38
	0.00	\$0.00	\$0.00	\$532	1.37
	643860	\$2,761,140.00	\$668.56	\$909	2.39

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	7,300.00	\$61,836.00	\$154.98	\$355	0.99
	7,300.00	\$1,025,840.00	\$795.22	\$934	3.22

602,000.00	\$1,863,145.00	\$1,224.14	\$1,634	4.05
300,000.00	\$1,102,000.00	\$596.19	\$810	2.19
300,000.00	\$1,102,000.00	\$282.39	\$588	1.46

	Percent increase in Wastewater bill	2% MHI	Total additional annual amount town would spend total to get to 2% MHI	
	0%	\$911.88	\$6,967,150.56	\$6,967,150.56
	0%	\$941.30	\$8,319,750.20	\$8,319,750.20
	48%	\$1,046.34	\$9,633,963.30	\$9,633,963.30
	65%	\$801.10	\$6,193,485.10	\$6,193,485.10
	0%	\$802.60	\$18,401,513.40	\$18,401,513.40
	173%	\$808.68	\$14,914,277.04	\$14,914,277.04
	85%	\$900.08	\$28,527,193.80	\$28,527,193.80

	81%		
	373%		
		\$1,014.58	\$341,090.14
	0%		
		\$775.00	\$393,578.80
	279%		
	77%		
		\$716.12	\$205,931.88
	574%		
		\$580.00	\$569,560.80

299%		
	\$806.40	\$603,990.48

WERF

Level	Description	Capital Cost (\$/gpd)	Operations (\$1,000/yr/10 MG Treated)
Level 1	No N and P removal	9.3	250
Level 2	1 mg/l TP; 8 mg/l TN	12.7	350
Level 3	0.1-0.3 mg/l TP; 4-8 mg/l TN	14.4	640
Level 4	<0.1 mg/l TP; 3 mg/l TN	15.3	880
Level 5	<0.01 mg/l TP; 1 mg/l TN	21.8	1370

Costs to Meet Criteria	Capital Cost (\$million/MGD)	Design Flow	Facility Upgrade Capital Costs (\$million)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)
Kalispell	0	5.4	\$0.00	\$0.00
Bozeman	0	13.8	\$0.00	\$0.00
Helena	3.4	5.4	\$18.36	\$1.47
Butte	Actual Costs	1	\$27.00	\$2.17
Missoula				
Great Falls	3.4	25	\$85.00	6.817
Billings	3.4	25	\$85.00	\$6.82
Livingston	3.4	5	\$17.00	1.3634
Miles City	6	3.7	\$22.20	1.78044
Hamilton	5	1.98	\$9.90	0.79398
Lewistown	1	2.5	\$2.50	0.2005
Manhattan				
Columbia Falls	Actual Costs	0.766	\$3,927,688.00	\$315,000.58
Havre	6	4.4	\$26.40	2.11728
Philipsburg	3.4	0.2	\$0.68	\$0.05
Cut Bank				
Deer Lodge				
Glendive	10		\$10.00	0.802
Red Lodge				

Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)	Operations (\$1/ MG/day Treated)	Operations Costs (\$/ year/ 1 MGD)	Actual Flow	Facility Upgrade Operations Costs (\$/year/1 MGD) based on Facility MGD	Membrane Replacement Cost (\$24,000 /yr/1 MGD)*Actual Flow - not necessary b/c no RO
\$0.00	0	0.00	3.10	0.00	0.00
\$0.00	0	0.00	5.80	0.00	0.00
\$1,472,472.00	100	36,500.00	3.00	109,500.00	0.00
\$2,165,400.00	0	0.00	4.00	1,125,000.00	0.00
\$6,817,000.00	100	36,500.00	26	949,000.00	0.00
\$6,817,000.00	100	36,500.00	26.00	949,000.00	0.00
\$1,363,400.00	100	36,500.00	2.00	73,000.00	0.00
\$1,780,440.00	630	229,950.00	2	459,900.00	0.00
\$793,980.00		350,000	0.68	238,000.00	
\$200,500.00		100,000.00	1.5	150,000.00	

\$315,000.58	0	0.00	0.37	0.00	0.00
\$2,117,280.00	630	229,950.00	2.8	643,860.00	0.00
\$54,536.00	100	36,500.00	0.20	7,300.00	0.00

\$802,000.00		300,000		300,000	
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Total Operations costs including membrane replacement
0.00
0.00
109,500.00
1,125,000.00
\$949,000.00
949,000.00
\$73,000.00
\$459,900.00
238,000.00
150,000.00

\$0.00
\$643,860.00
7,300.00

300,000

	Community	Median Household Income (2010) - countywide MHI. Recommend updating for service area.	Population	Estimated Number of Households (Population / 2.5) based on 2000 Census	Current Average Annual Household Wastewater Bill	Design Flow (MGD)	Actual Flow (MGD)	Current wastewater MHI	Percent MHI needed to get to RO/Base Numeric Nutrient Criteria (including current fees)
	Kalispell	\$39,953.00	19,927	7,705	\$216.00	5.4	3.10	0.54%	2.58%
	Bozeman	\$41,661.00	37,280	14,614	\$372.00	13.8	5.80	0.89%	2.92%
	Helena	\$47,152.00	28,190	12,337	\$265.44	5.4	3.00	0.56%	1.74%
	Butte	\$37,335.00	33,525	14,041	\$360.00	8.5	4.00	0.96%	2.15%
	Billings	\$45,004.00	104,170	41,841	\$218.28	26	26	0.49%	2.41%
	Missoula	\$34,319.00	66,788	27,553	\$152.14	12	9	0.44%	1.47%
	Great Falls	\$40,718.00	58,505	23,998	\$187.20	26	26	0.46%	4.18%
	Livingston	\$35,689.00	7,044	3,188	\$600.00	5	2	1.68%	6.85%
	Miles City	\$37,554.00	8,410	3,518	\$236.10	3.7	2	0.63%	4.09%
	Hamilton	\$25,161.00	4,348	2,092	\$276.00	1.98	0.68	1.10%	5.44%
	Lewistown	\$31,729.00	5,901	2,727	\$387.60	2.5	1.5	1.22%	3.43%
	Havre	\$43,577.00	9,310	3,709	\$240.00	1.8	1	0.55%	2.04%
	Columbia Falls	\$38,750.00	4,688	1,621	\$532.20	0.766	0.37	1.37%	3.02%
	Manhattan	\$50,729.00	1,520	523	\$362.40	0.6	0.4	0.71%	2.60%
	Lolo	\$46,442.00	3,892	1,060	\$363.00	0.34	0.38	0.78%	1.81%
	Stevensville	\$33,776.00	1,809	795	\$535.08	0.3	0.29	1.58%	3.17%

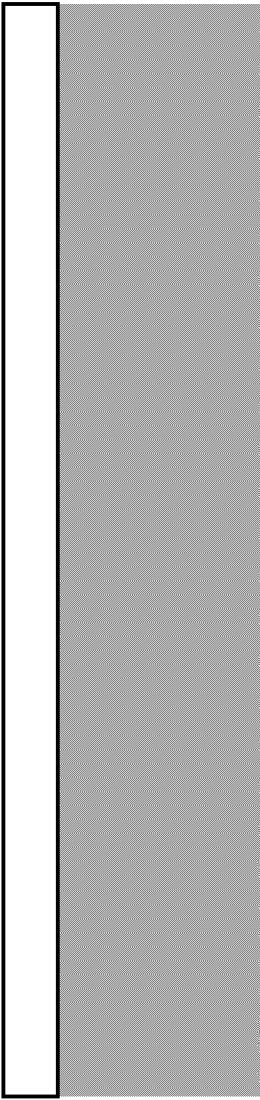
	Philipsburg	\$31,375.00	820	399	\$200.00	0.2		0.64%	4.19%
							0.2		
	Cut Bank	\$44,833.00	2,869	1,290	\$138.48	0.643	0.643	0.31%	2.68%
	Deer Lodge	\$40,320.00	3,111	1,522	\$409.56	3.3		1.02%	3.89%
	Glendive	\$42,821.00	4935	1,883	\$213.96	1.3	N/A	0.50%	3.67%

	Redlodge	\$50,123.00	2125	1,055	\$305.28	1.2	0.61%	5.16%	
						0.65			

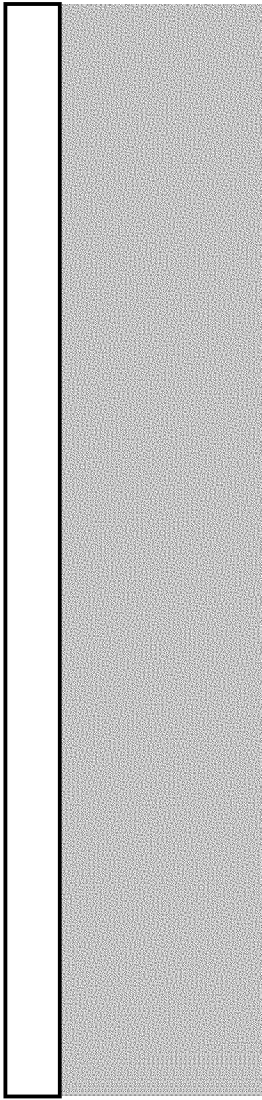
	Big Fork	\$44,398.00	4270	1,708	\$580.36	0.5		1.31%	2.65%

	Highwood	\$62,614.00	176	53	\$600.00	0.026		0.96%	2.54%
	Circle	\$29,000.00	615	234	\$259.56	0.16	0.015 0.065	0.90%	5.47%

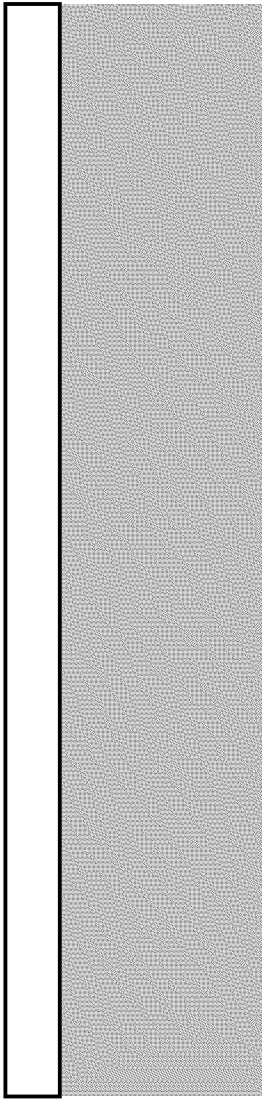
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Yellow fill = Greater than 2% MHI to reach to certain level of wastewater treatment



Orange fill = Greater than 100% increase in wastewater fee costs to reach to certain level of w



Blue Fill = Town already meets the standard so no new costs or treatment needed

Increase over current Wastewater Bill to Reach RO	Percent MHI needed to get to Variance in SB367 (including current fees)	Increase over current Wastewater Bill to Reach Variance	2% MHI per household	Total additional annual amount Town Would Need to Spend to get to 2% MHI
186%	0.47%	0%	\$799	\$4,492,477
228%	0.79%	0%	\$833	\$6,740,269
196%	0.75%	48%	\$943	\$8,359,551
123%	1.48%	65%	\$747	\$5,429,655
398%	0.90%	85%	\$900	\$28,527,194
232%	N/A	N/A	\$686	\$14,719,915
808%	1.26%	173%	\$814	\$15,050,586
307%			\$714	\$362,731
551%			\$751	\$1,811,700
396%			\$503	\$475,344
180%			\$635	\$673,514
270%			\$872	\$2,342,382
120%	1.37%	0%	\$775	\$393,579
264%	3.38%	373%	\$1,015	\$341,090
131%				
100%				

557%	0.99%	77%		
767%	3.22%	574%	\$628	\$170,573
283%	4.05%	299%	\$897	\$978,052
635%			\$806	\$603,990
			\$856	\$1,209,752

747%

\$1,002

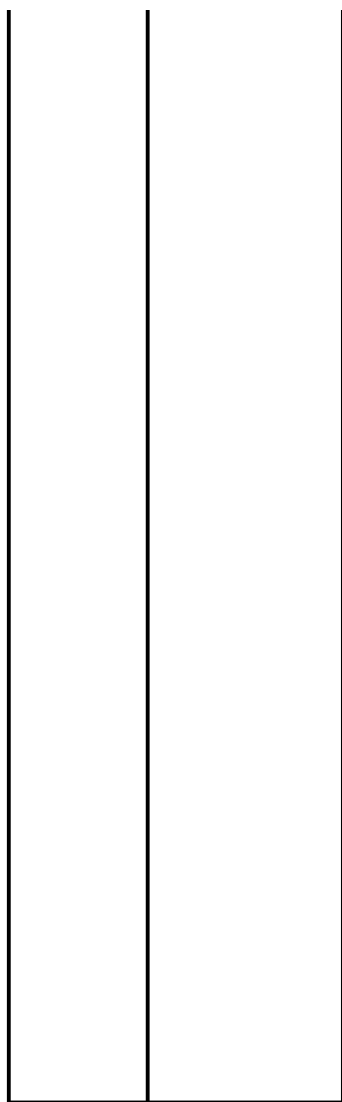
\$735,525

103%

\$888

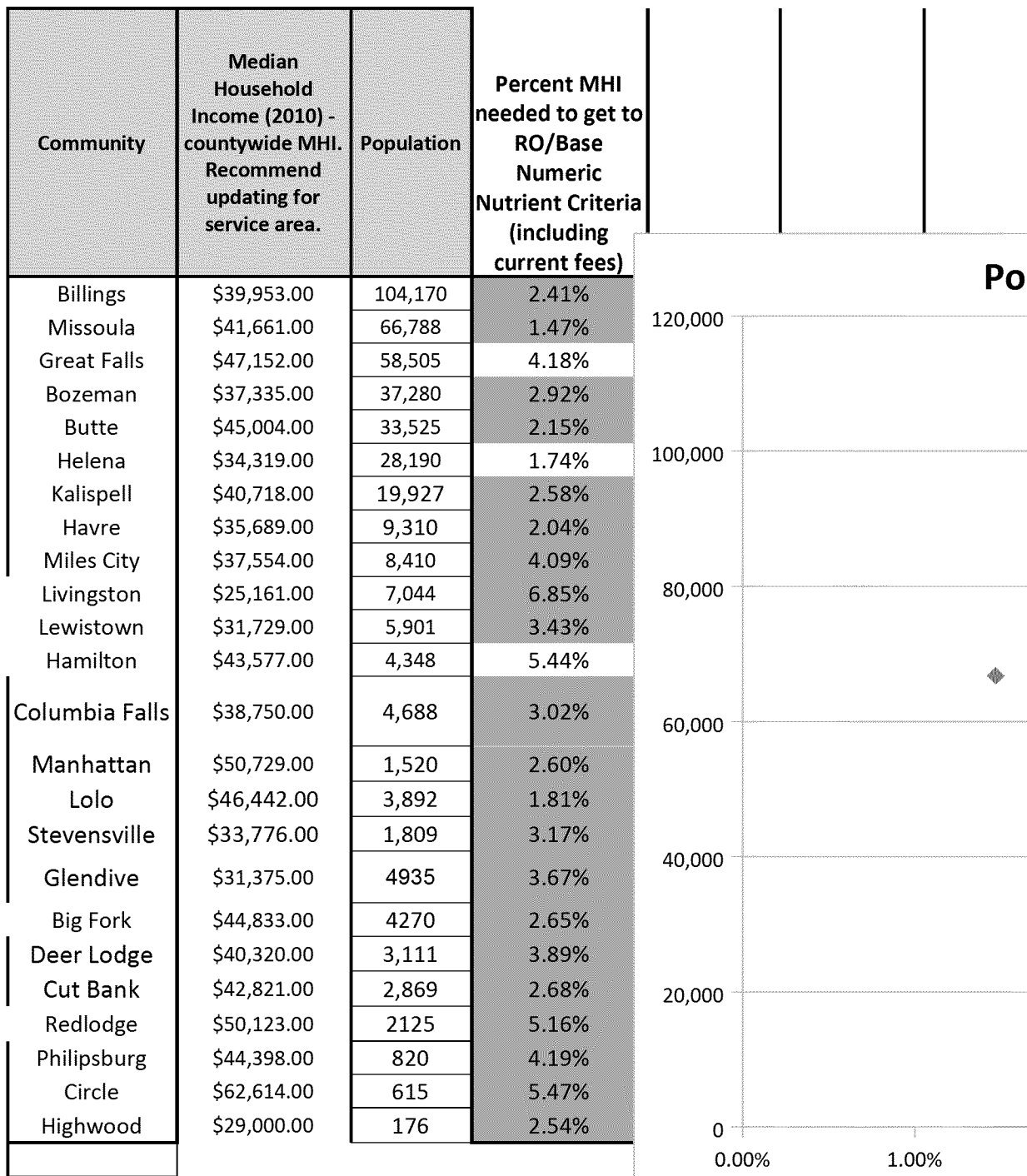
\$525,381

165%				
511%			\$1,252 \$580	\$34,571 \$74,983



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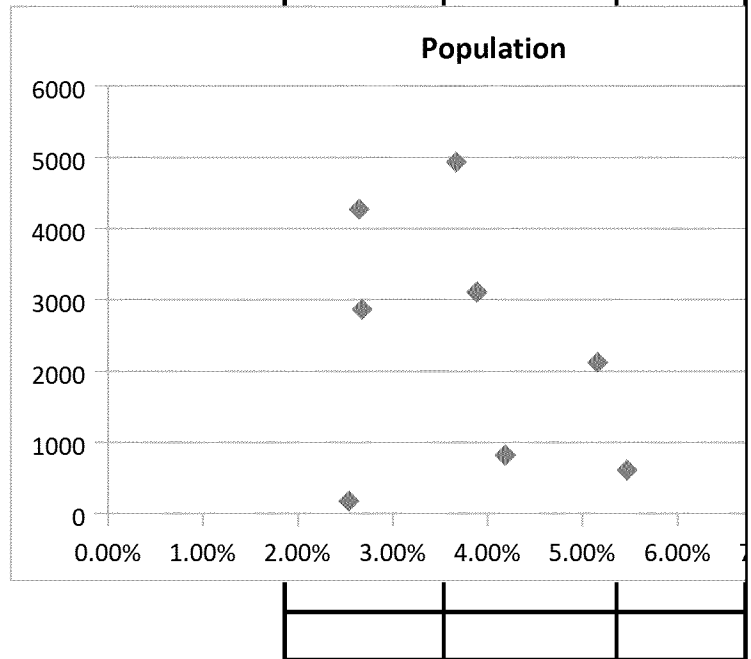
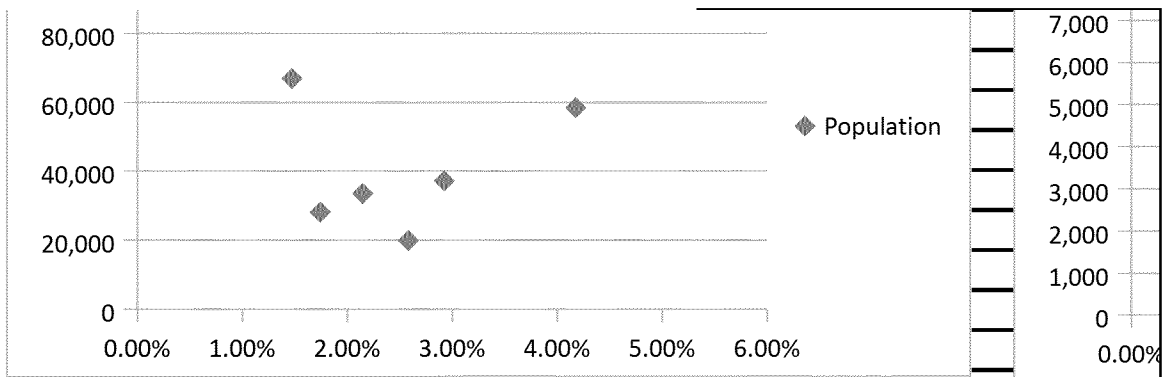


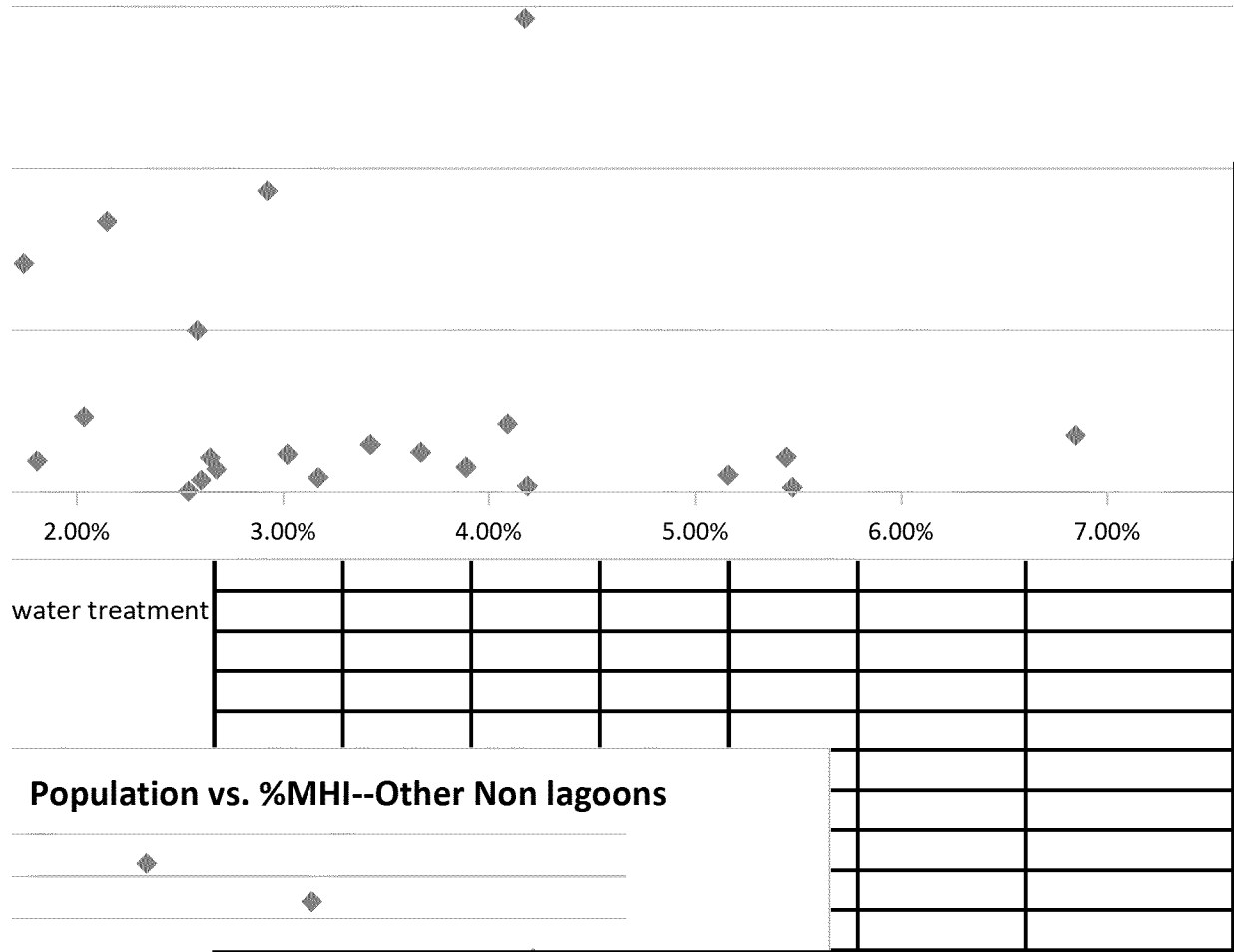
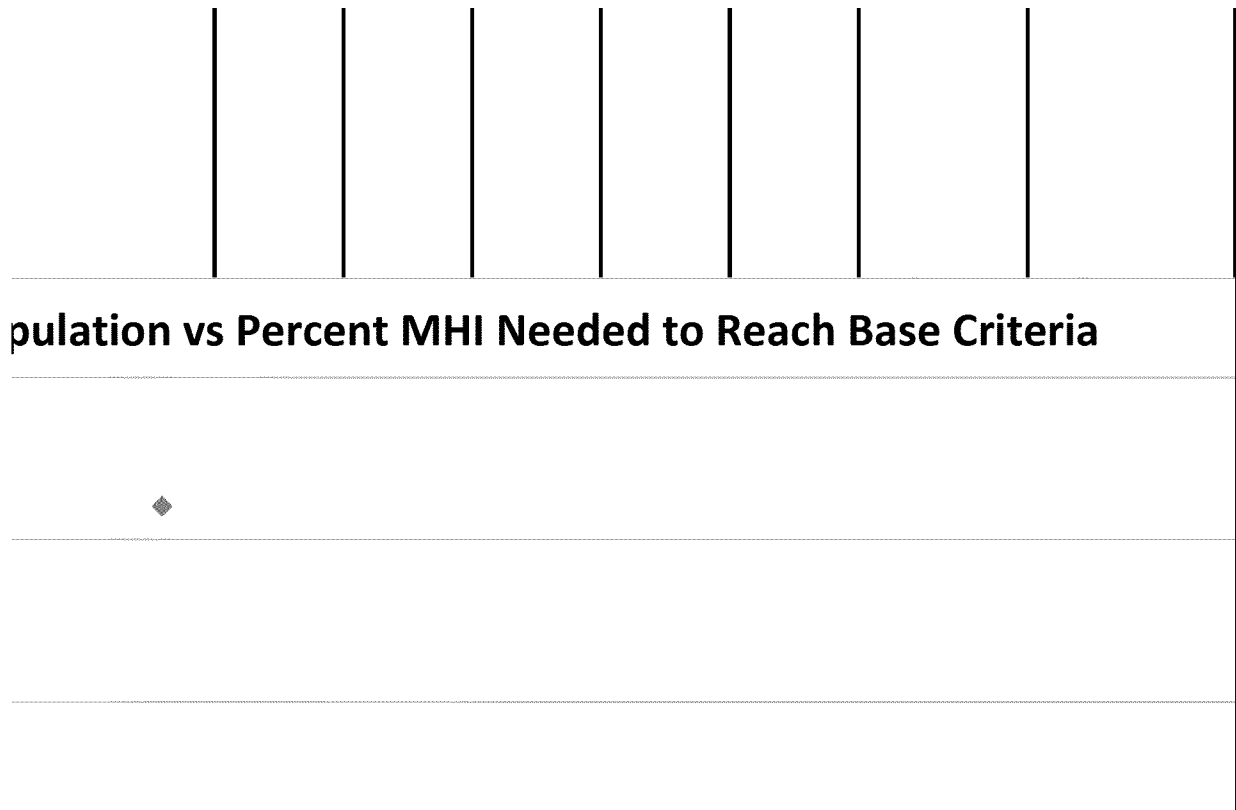
Yellow fill = Greater than 2% MHI to reach to certain level of wastewater treatment

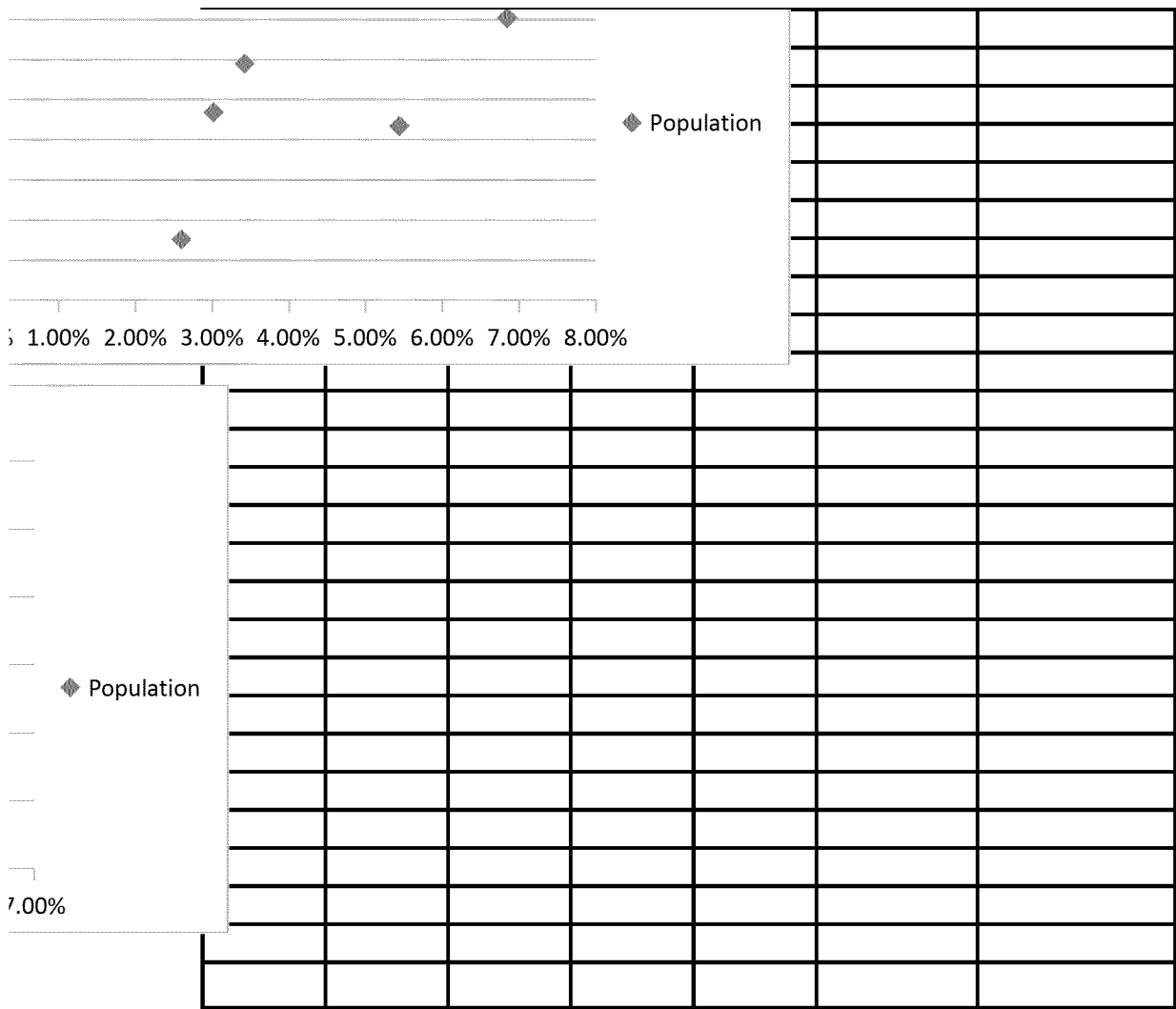
Orange fill = Greater than 100% increase in wastewater fee costs to reach to certain level of waste

Blue Fill = Town already meets the standard so no new costs or treatment needed



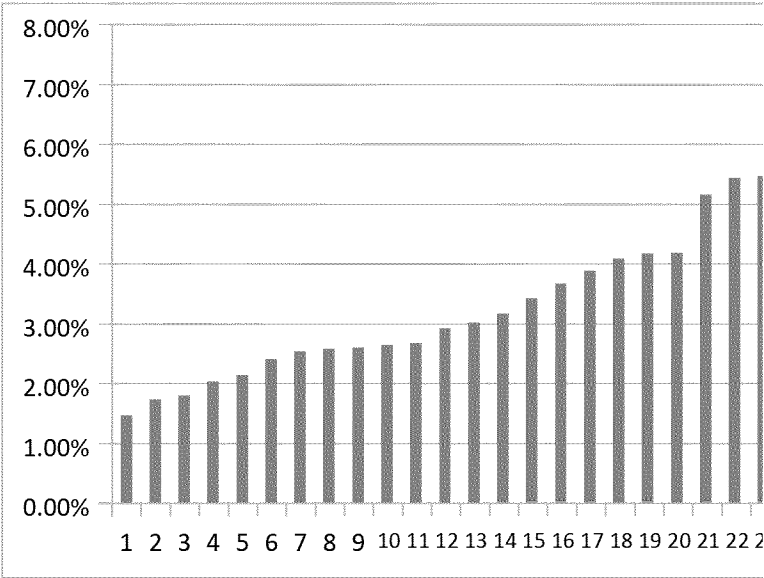


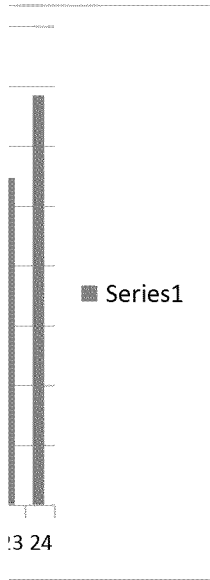




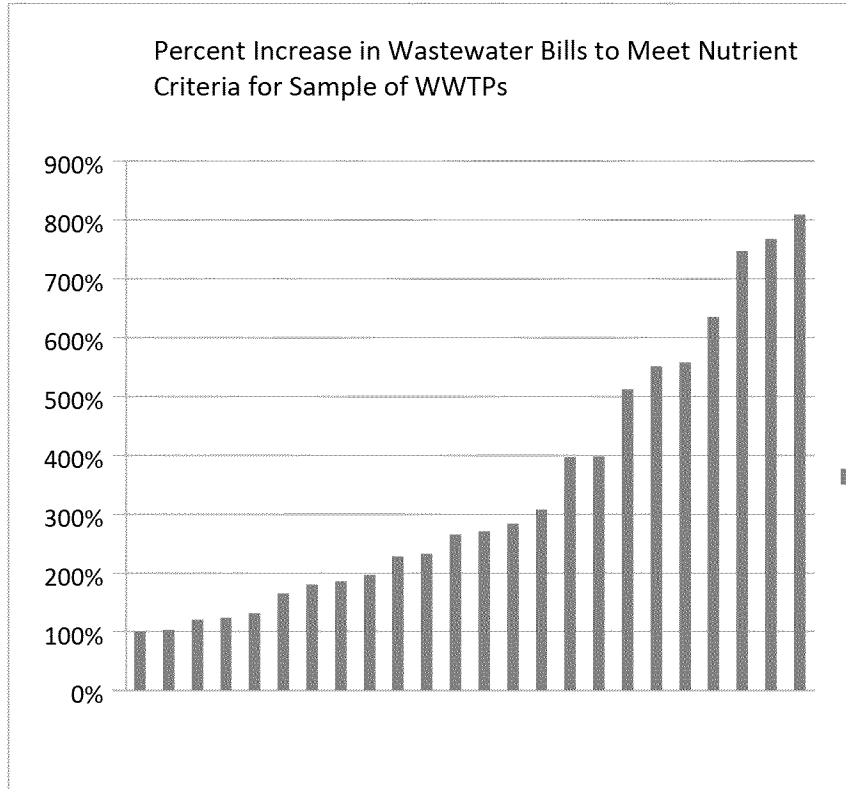
1.47%
1.74%
1.81%
2.04%
2.15%
2.41%
2.54%
2.58%
2.60%
2.65%
2.68%
2.92%
3.02%
3.17%
3.43%
3.67%
3.89%
4.09%
4.18%
4.19%
5.16%
5.44%
5.47%
6.85%

Total MHI% to meet nutrient criteria





100%
 103%
 120%
 123%
 131%
 165%
 180%
 186%
 196%
 228%
 232%
 264%
 270%
 283%
 307%
 396%
 398%
 511%
 551%
 557%
 635%
 747%
 767%
 808%





Community	Design Flow (MGD)	Actual Flow (MGD)	# of Households (2010) ACS five year	Current WW annual bill	MHI 2010 (ACS 5 year estimate)	Annual Capital cost to meet WERF 3 (dollars)
Kalispell	5.4	3.10	7,705	\$216	\$39,023	\$0.00
Bozeman	13.8	5.80	14,614	\$372	\$42,218	\$0.00
Helena	5.4	3.00	12,337	\$265	\$46,313	\$1,472,472.00
Butte	8.5	4.00	14,041	\$360	\$38,178	\$0.00
Billings	26	26	41,841	\$218	\$46,433	\$6,817,000.00
Missoula	12	9	27,553	\$152	\$36,547	\$0.00
Great Falls	26	26	23,998	\$187	\$40,935	\$6,817,000.00
Livingston	5	2	3,188	\$600	\$33,937	\$1,363,400.00
Miles City	3.7	2	3,518	\$236	\$37,268	\$1,008,916.00
Hamilton	1.98	0.68	2,092	\$276	\$24,234	\$539,906.40
Lewistown	2.5	1.5	2,727	\$388	\$32,997	\$0.00
Havre	1.8	1.38	3,709	\$240	\$42,518	\$490,824.00
Less than 1 MGD						
Big Fork	0.69	0.3	1,708	\$580.36	\$52,147.00	\$282,223.80
Big Sky	0.44	0.22	514	\$357.24	\$49,850.00	\$179,968.80
Chinook	0.5	0.167	696	\$464.88	\$36,389.00	\$204,510.00
Choteau	0.3	0.219	802	\$464.88	\$33,241.00	\$122,706.00
Colstrip	0.6	0.48	812	\$464.88	\$74,095.00	\$245,412.00
Columbia Falls	0.766	0.37	1,875	\$532.20	\$38,107.00	\$0.00
Conrad	0.5	0.375	1,208	\$464.88	\$39,444.00	\$204,510.00
East Helena	0.434	0.322	794	\$279.60	\$46,227.00	\$177,514.68
Forsyth	0.54	0.248	722	\$464.88	\$38,661.00	\$220,870.80
Laurel	0.88	0.853	2,603	\$464.88	\$40,906.00	\$359,937.60
Libby	0.511	0.381	1,290	\$218.52	\$25,167.00	\$209,009.22
Manhattan	0.6	0.4	523	\$362.40	\$52,350.00	\$0.00
Lolo	0.34	0.38	1,060	\$363.00	\$50,469.00	\$139,066.80
Poplar	0.6	0.24	405	\$224.04	\$19,026.00	\$245,412.00
Stevensville	0.3	0.29	795	\$535.08	\$33,293.00	\$122,706.00

NOTE: Operation costs include energy and chemical costs only and do not include labor and maintenance cost. A

NOTE: The numbers are intended to provide ROUGH ESTIMATES for discussion purposes and do not reflect the s

NOTE: Capital costs were assumed to cover a 20-year bond with 5% interest (used 0.0802 conversion factor)

NOTE: MHI is based on data from Montana CEIC based on 2010 estimates.

Annual Operations costs to meet WERF 3 (dollars)	Annual Capital and Operations cost (\$)	Current MHI	MHI to Meet WERF Level 3	Percent increase in Wastewater bill
\$0.00	\$0	0.55%	0.55%	0.00%
\$0.00	\$0	0.88%	0.88%	0.00%
\$109,500.00	\$1,581,972	0.57%	0.85%	48.31%
\$0.00	\$0	0.94%	0.94%	0.00%
\$949,000.00	\$7,766,000	0.47%	0.87%	85.03%
\$0.00	\$0	0.42%	0.42%	0.00%
\$949,000.00	\$7,766,000	0.46%	1.25%	172.87%
\$73,000.00	\$1,436,400	1.77%	3.10%	75.09%
\$73,000.00	\$1,081,916	0.63%	1.46%	130.26%
\$24,820.00	\$564,726	1.14%	2.25%	97.81%
\$0.00	\$0	1.17%	1.17%	0.00%
\$50,370.00	\$541,194	0.56%	0.91%	60.80%
MGD				
42,705.00	\$324,929	1.11%	1.48%	32.78%
31,317.00	\$211,286	0.72%	1.54%	115.07%
23,772.45	\$228,282	1.28%	2.18%	70.55%
31,174.65	\$153,881	1.40%	1.98%	41.27%
68,328.00	\$313,740	0.63%	1.15%	83.11%
0.00	\$0	1.40%	1.40%	0.00%
53,381.25	\$257,891	1.18%	1.72%	45.92%
45,836.70	\$223,351	0.60%	1.21%	100.66%
35,302.80	\$256,174	1.20%	2.12%	76.32%
121,424.55	\$481,362	1.14%	1.59%	39.78%
54,235.35	\$263,245	0.87%	1.68%	93.39%
0.00	\$0	0.69%	0.69%	0.00%
13,870.00	\$152,937	0.72%	1.01%	39.75%
8,760.00	\$254,172	1.18%	4.48%	280.12%
10,585.00	\$133,291	1.61%	2.11%	31.33%

s such, these numbers are on the low side.
ite-specific conditions at each plant.

Community	Current Treatment Technology	Would the criteria apply? Or is there dilution capability?	Design Flow (MGD)	Actual Flow (MGD)	Community Population (Census 2010)	Number of Households (American Community Survey 2005-2009)
Big 7 Communities						
Kalispell	BNR (modified Johannesburg); 3.1 to 5.4 MGD; avg. .12 mg/l TP; 10 mg/l TN.	Yes. EOP; Ashley Creek	5.4	3.10	19,927	7,705
Bozeman	some BNR now; 5-stage Barrdenpho; new plant will be BNR (1 mg/l TP; 3 mg/l TN starting in 2011); current 5.8 MGD; increasing to 13.9 mgd	Yes. Also Gallatin TMDL in the works.	13.8	5.80	37,280	14,614
Helena	BNR; 3 mg/l TP; 10 mg/l TN; design capacity of 5.4; current discharge ~3.0 MGD	Yes. WLA set in TMDL based on numeric criteria.	5.4	3.00	28,190	12,337
Butte	Current technology is activated sludge (TN of 18.5 mg/l; TP of 2.11 mg/l); under Order to Construct to membrane BNR; current design is 8.5 MGD; talking about lowering to 6.1 MGD. Sewer Fee based on DEQ estimates. Included in current fee is \$27 million upgrade in new capital costs and \$1.125 million in O&M costs which would bring them to 5 TN and 0.1 TP	Yes. EOP.	8.5	4.00	33,525	14,041
Billings	2ndary treatment; Design flow of 26 MGD (avg.) and 40 MGD max.	Yes. Discharge into the Yellowstone River.	26	26	104,170	41,841
Missoula	advanced secondary treatment facility with biological nutrient removal and ultraviolet disinfection; meets Clark Fork criteria w/ mixing zone. 8.2 mg/l TN; 0.16 -0.4 mg/l TP; get a mixing zone, meeting criteria currently. BNR. Design flow = 12 MGD ; actual flow = 9 MGD. (designed for 10 and 1). (HDR)	Yes. With mixing zone. Currently meeting criteria after mixing zone.	12	9	66,788	27,553

Great Falls	conventional 2ndary activated sludge (max 21-MGD; avg. 10 MGD)	Yes. Missouri River	26	26	58,505	23,998
Other Large Communities > 1 MGD						
Livingston	discharges into the Yellowstone; permit renewed in 2010; mechanical plant w/ 2 primary clarifiers, 3 rotating biological contactors, UV, installing co-composting. DMR shows 11 mg/l TN average (20 mg/l for May) and 2 mg/l TP (3 mg/l for May).	Yes. Discharge into the Yellowstone River.	5	2	7,044	3,188
Miles City	2ndary treatment plus oxidation ditch. 2011 permit. Algae plant study to remove nutrients. Extended aeration system w/2 oxidation ditches w/rotating brush aerators; 2 clarifiers and chlorine basin. TN avg of 23.5 mg/l; TP avg. 3.6 mg/l.	Yes. Discharge into the Yellowstone River.	3.7	2	8,410	3,518
Hamilton	BNR facility. t w/ extended aeration system. Oxidation ditch w/ rotating brush aerators. 3 clarifiers. Upgraded in 2010. TN avg. 5.5 mg/l; TP avg. 5 mg/l.	Yes	1.98	0.68	4,348	2,092
Lewistown	BNR plant. Focus on TP removal. 0.8 mg/l TP; 3-4 mg/l TN.	Yes	2.5	1.5	5,901	2,727
Havre	Discharges into the Milk River. Permit renewed in 2011. Activated sludge facility with effluent chlorination. 2006-2010 data showed avg. TP of 3.4 (TN not required). 2011 DMR showed TN of 19.4 mg/l; Tp of 1.3 mg/l.	Yes	1.8	1.38	9,310	3,709
Non-Lagoon Facilities with < 1MGD						
Columbia Falls	Newer plant. Designed to achieve 8 mg/l TN	Yes	0.766	0.37	4,688	1,621

Manhattan	Discharges into Diva Ditch. Permit renewed in 2010. Denitrification with fixed film suspended growth system, clarifiers and aerobic sludge digestion, UV. DMR data from winter quarter shows 11 mg/l TN and 1 mg/l TP. 2008-2010 showed avg. TN of 14 mg/l TN and 4 mg/l TP.	Yes	0.6	0.4	1,520	523
Lolo	No steps towards nutrient removal. For Lolo, TN is generally less than 30 mg/l and TP less than 7. Generally heaving loadings for Lolo. Sewer rates--Lolo \$30.25-ish/mo - (RSID) based on property values	Yes	0.34	0.38	3,892	1,060
Stevensville	Stevensville is generally a little better with TN generally below 20 and TP less than 4.	Yes	0.3	0.29	1,809	795
Lagoons						
Philipsburg	lagoon - ref: Gary Swanson, consulting engineer- 15TN, 2TP	Yes.	0.2	0.2	820	399
Cut Bank	Lagoon.	Yes	0.643	0.643	2,869	1,290
Deer Lodge	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork	Yes	3.3	1.06	3,111	1,522
Glendive	domestic WW lagoon; 3 cell facultative; current O&M costs are <\$; 8-10 capital costs for new plant. O&M increase of ~\$300,000. new avg. 1.15 MGD; PER completed to upgrade to mechanical SBR or BNR plant.	Yes	1.3	0.6	4935	1883

Median Household Income (2010) - American Community Survey.	Current average household sewer bill per year (2008 / 2011)	Current average sewer fee as % of MHI	Notes	Capital cost (million dollars) to meet the numeric nutrient criteria (WERF)	Annual Capital cost to meet the numeric nutrient criteria (L4 WERF)	Annual Operations costs to meet the numeric nutrient criteria L4WERF	Annual Capital and Operations cost (\$)
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Big 7 Communities

\$39,953.00	\$361.68	0.91%	Sewer rates obtained from City in 2011. Plant ~WERF Level 2. \$30.14/month Based on a base rate of \$15.00 with a usage rate of \$4.19/1000 gal of water used	#REF!	#REF!	#REF!	#REF!
\$41,661.00	\$372.00	0.89%	Sewer rates obtained from City in 2011. Plant ~WERF Level 2. Really Level 3 for TN and 1 for TP	#REF!	#REF!	#REF!	#REF!
\$47,152.00	\$277.80	0.59%	Sewer rates obtained from City in 2011. Plant ~ WERF Level 1.	#REF!	#REF!	#REF!	#REF!
\$37,335.00	\$360.00	0.96%	Sewer Fee based on DEQ estimates. While current monthly fee is \$13.50, the \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP (WERF 3) would raise rates to \$30 per month	#REF!	#REF!	#REF!	#REF!
\$45,004.00	\$218.28	0.49%	The numbers for Billings and Great Falls (treatment levels, treatment costs etc.) were obtained from HDR.	312.50	#REF!	#REF!	#REF!
\$34,319.00	\$152.14	0.44%	Sewer rates obtained from city. 2011 values.	#REF!	#REF!	#REF!	#REF!

\$40,718.00	\$187.20	0.46%	At WERF 1. The numbers for Billings and Great Falls (population, treatment levels, etc.) were obtained from HDR.	312.50	#REF!	#REF!	#REF!
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Other Large Communities > 1 MGD

\$35,689.00	\$600.00	1.68%	Assume WERF Tier 1	#REF!	#REF!	\$865,600	#REF!
\$37,554.00	\$236.10	0.63%	Assume WERF Tier 1	#REF!	#REF!	#REF!	#REF!
\$25,161.00	\$276.00	1.10%	Assume WERF 2 (since TN gets to WERF 3 and TP WERF 1)	24.75	#REF!	#REF!	#REF!
\$31,729.00	\$387.60	1.22%	Assume WERF 3 based on current treatment levels	18.50	#REF!	#REF!	#REF!
\$43,577	\$240.00	0.55%	Assumed WERF Level 1 and 5,000 gallons usage. Rate is \$9.15 flat plus \$2.15 per 1,000 gallons	#REF!	#REF!	#REF!	#REF!

Non-Lagoon Facilities with < 1MGD

\$38,750	\$532.20	1.37%	Upgrade to RO	\$0.00	\$0	#REF!	#REF!
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\$50,729	\$362.40	0.71%	Assumed WERF Level 2. Correct? Paul.	\$0.00	\$0	#REF!	#REF!
\$46,442	\$363.00	0.78%	Level 1.	\$1.16	\$92,711	#REF!	#REF!
\$33,776	\$535.08	1.58%		\$1.02	\$81,804	#REF!	#REF!

Lagoons

\$31,375.00	\$200.00	0.64%	Assume WERF 1	#REF!	#REF!	#REF!	#REF!
\$44,833	\$138.48	0.31%	4000 gallons. Base rate \$9.48 at 3000 gallons plus \$2.06 for next 1,000 gallons	#REF!	#REF!	#REF!	#REF!
\$40,320	\$409.56	1.02%	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork	#REF!	\$1,261,145.00	#REF!	#REF!
\$42,821	\$213.96	0.50%		#REF!	#REF!	#REF!	#REF!

\$50,123	305.28	0.61%	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	#REF!	#REF!	#REF!	#REF!
\$44,398	580.36	1.31%		#REF!	#REF!	#REF!	#REF!
\$62,614	600.00	0.96%		#REF!	#REF!	#REF!	#REF!
\$29,000	259.56	0.90%		#REF!	#REF!	#REF!	#REF!

e.

Annual Additional Cost per Household (increase in sewer rate)	Predicted average household sewer fee to meet criteria	Expected % MHI to Meet Base Numeric Nutrient Criteria (plus current wastewater fees)	Percent increase in Wastewater bill		
#REF!	#REF!	#REF!	#REF!		
#REF!	#REF!	#REF!	#REF!		
#REF!	#REF!	#REF!	#REF!		
#REF!	#REF!	#REF!	#REF!		
#REF!	#REF!	#REF!	#REF!		
#REF!	#REF!	#REF!	#REF!		
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	#REF!	#REF!	#REF!	#REF!		
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	#REF!	#REF!	#REF!	#REF!		
	#REF!	#REF!	#REF!	#REF!		
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	#REF!	#REF!	#REF!	#REF!		

#REF!	#REF!	#REF!	#REF!		
#REF!	#REF!	#REF!	#REF!		
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#REF!	#REF!	#REF!	#REF!
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#REF!	#REF!	#REF!	#REF!		

WERF

Level	Description	Capital Cost (\$/gpd)	Operations (\$1/MG/day)
Level 1	No N and P removal	9.3	250
Level 2	1 mg/l TP; 8	12.7	350
Level 3	0.1-0.3 mg/l TP; 4-8 mg/l	14.4	640
Level 4	<0.1 mg/l TP; 3 mg/l	15.3	880
Level 5	<0.01 mg/l TP; 1 mg/l	21.8	1370

	Costs to Meet Criteria	Capital Cost per MGD to Get To WERF 2 (\$million/MGD)	Design Flow of Facility	Total Facility Upgrade Capital Costs (\$million)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$/year)
	Big Fork	3.4	0.69	\$2.35	0.18815	\$188,149.20
	Big Sky	3.4	0.44	\$1.50	0.11998	\$119,979.20
	Chinook	3.4	0.5	\$1.70	0.13634	\$136,340.00
	Choteau	3.4	0.3	\$1.02	0.08180	\$81,804.00
	Colstrip	3.4	0.6	\$2.04	0.16361	\$163,608.00
	Columbia Falls	0	0.766	\$0.00	0	\$0.00
	Conrad	3.4	0.5	\$1.70	0.13634	\$136,340.00
	East Helena	3.4	0.434	\$1.48	0.11834	\$118,343.12
	Forsyth	3.4	0.54	\$1.84	0.14725	\$147,247.20
	Laurel	3.4	0.88	\$2.99	0.23996	\$239,958.40
	Libby	3.4	0.511	\$1.74	0.13934	\$139,339.48
	Manhattan	0	0.6	\$0.00	0	\$0.00
	Lolo	3.4	0.34	\$1.16	0.09271	\$92,711.20
	Poplar	3.4	0.6	\$2.04	0.16361	\$163,608.00
	Stephensville	3.4	0.3	\$1.02	0.08180	\$81,804.00

Operation cost per day per 1 MG treated (dollars)	Operations Costs (\$/ year/ 1 MGD)	Actual Flow	Annualized Facility Upgrade Operations Costs based on Facility MGD
100	36,500.00	0.3	\$10,950.00
100	36,500.00	0.22	\$8,030.00
100	36,500.00	0.167	\$6,095.50
100	36,500.00	0.219	\$7,993.50
100	36,500.00	0.48	\$17,520.00
0	0.00	0.37	\$0.00
100	36,500.00	0.375	\$13,687.50
100	36,500.00	0.322	\$11,753.00
100	36,500.00	0.248	\$9,052.00
100	36,500.00	0.853	\$31,134.50
100	36,500.00	0.381	\$13,906.50
0	0.00	0.4	\$0.00
100	36,500.00	0.38	\$13,870.00
100	36,500.00	0.24	\$8,760.00
100	36,500.00	0.29	\$10,585.00

Community	Current Treatment Technology
> 1 MGD	
Kalispell	Already below variance levels; achieving avg. 0.12 mg/l TP and 10 mg/l TN. Town expected to pay an addition \$6,967,150.56 annually to achieve 2% MHI.
Bozeman	Already below variance levels; should be close to achieving 1 mg/l TP and 3 -5 mg/l TN starting in 2011/2-12. Town expected to pay an additional \$8,319,750.2 annually to achieve 2% MHI.
Helena	After optimization study, should be achieving variance levels. Currently at 3 mg/l TP and 10 mg/l TN. Town expected to pay an additional \$9,633,963.3 annually to achieve 2%MHI.
Butte	Under Order to Construct to membrane BNR Will already meet variance levels after upgrade. The \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP. Upgrade would result in 1.5% MHI. Additional costs needed?
Missoula	Already meets Clark Fork criteria w/ mixing zone. Achieving 8.2 mg/l TN; 0.16 -0.4 mg/l TP. Would the town be expected to pay more (~\$18 million annually) towards 2% MHI or not since they are achieving the criteria?
Great Falls	Conventional 2ndary activated sludge (max 21-MGD; avg. 10 MGD). Based on Billings case study, likely long-term variance limits of Level 4 for WERF (0-.1 mg/l TP; 3 mg/l TN)
Billings	2ndary treatment; Design flow of 26 MGD (avg.) and 40 MGD max. Based on Billings case study, likely long-term variance limits of Level 4 for WERF (0-.1 mg/l TP; 3 mg/l TN)

Livingston	Based on existing high costs, likely that meeting 1 mg/l and 10 TN would be the feasible limits. MHI of 3.05 percent to achieve WERF level 3.
Miles City	2011 permit; calculated variance limits to <0.1 mg/l TP; 3 mg/l TN
Hamilton	BNR facility. t w/ extended aeration system. Oxidation ditch w/ rotating brush aerators. 3 clarifiers. Upgraded in 2010.
Lewistown	Already below variance levels;BNR plant. Lready below proposed interim effluent limits (0.8 mg/l TP; 3-4 mg/l TN).
Facilities with < 1MGD	
Manhattan	Discharges into Diva Ditch. Permit renewed in 2010. Denitrification with fixed film suspended growth system, clarifiers and aerobic sludge digestion, UV. DMR data from winter quarter shows 11 mg/l TN and 1 mg/l TP. 2008-2010 showed avg. TN of 14 mg/l TN and 4 mg/l TP.
Columbia Falls	Columbia Falls already meets variance level standards. Actual cost of \$3,927,688
Havre	Discharges into the Milk River. Permit renewed in 2011. Activated sludge facility with effluent chlorination. 2006-2010 data showed avg. TP of 3.4 (TN not required). 2011 DMR showed TN of 19.4 mg/l; Tp of 1.3 mg/l.
Lagoons	
Philipsburg	lagoon to simple mechanical system - ref: Gary Swanson, consulting engineer- 15TN, 2TP; Do we have actual costs for the upgrade?
Cut Bank	

Deer Lodge	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork
Glendive	Upgrade from a lagoon to mechanical plant - BNR or otherwise would result in > 2%MHI
Redlodge	Upgrade from a lagoon to mechanical plant - BNR or otherwise would result in >1.5% MHI

2% MHI information
draft numbers pending input

Flow Category	Community Population	Number of Households (Population / 2.5) based on 2000 Census	Median Household Income (2010) - countywide MHI. Recommend updating for service area.	Current average household sewer bill per year (2008 / 2011)
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> 1 MGD (1 mg/l TP; 10 mg/l TN)	27,544	10,012	\$45,594.00	\$216.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	37,280	14,614	\$47,065.00	\$372.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	28,190	12,337	\$52,317.00	\$265.44
> 1 MGD (1 mg/l TP; 10 mg/l TN)	33,525	14,041	\$40,055.00	\$360.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	108,623	28,290	\$40,130.00	\$152.14
> 1 MGD (1 mg/l TP; 10 mg/l TN)	82,178	23,998	\$40,434.00	\$187.20
> 1 MGD (1 mg/l TP; 10 mg/l TN)	104,170	41,841	\$45,004.00	\$218.28

> 1 MGD (1 mg/l TP; 10 mg/l TN)	7414	2965.6	35,689	\$600.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	9500	3800	37,554	\$236.10
> 1 MGD (1 mg/l TP; 10 mg/l TN)	5,200	2080	25,161	\$276.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	5,813	2,325	31,729	\$387.60

Facilities with

Yes	1,520	523	\$50,729	\$362.40
Yes- but Columbia Falls already meets it	4,688	1,621	\$38,750	\$532.20
	10,325.00	4130	\$38,082	240.00

Yes.	820	399	35806.00	200
Yes	2,869	1,290	\$29,000	\$138.48

Yes	3,111	1,522	\$40,320	\$409.56
	4621.00	1848.40	37000.00	213.96
	9,756.00	3,902	\$40,379	305.28

Current average sewer fee as % of MHI	Notes	Capital cost (million dollars) to meet the approximate variance levels (WERF)	Annual Capital cost to meet the approximate variance levels (L4 WERF)
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> 1 MGD

0.47%	Already meeting variance levels. Sewer rates obtained from City in 2011. Plant ~WERF Level 2.	\$0.00	\$0.00
0.79%	Already meeting variance levels. Sewer rates obtained from City in 2011. Plant ~WERF Level 2. Really Level 3 for TN and 1 for TP	\$0.00	\$0.00
0.51%	Sewer rates obtained from City in 2011. Plant ~ WERF Level 1.	\$18.36	\$1,472,472.00
0.90%	Will already meet variance levels after upgrade. While current monthly fee is \$13.50, the \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP would raise rates to \$30 per month	\$27.00	\$2,165,400.00
0.38%	Already meets variance levels	\$0.00	\$0.00
0.46%	and Great Falls (treatment levels, cost, etc.) were obtained from HDR.	\$85.00	\$6,817,000.00
0.49%	and Great Falls (treatment levels, cost, etc.) were obtained from HDR.	\$85.00	\$6,817,000.00

1.68%		17.00	1,363,400.00
0.63%		22.20	1,780,440.00
1.10%		5.00	793,980.00
1.22%		1.00	200,500.00

Facilities with < 1MGD

0.71%	Mainly designed to remove ammonia and some TN, but now have NO3 limit. May be able to meet with operational changes. TP of 2 mg/l may require more capital & O&M expenses. Ref: planning document, SRF loan application	\$7.56	\$606,312.00
1.37%	Upgrade to an existing Chemical P-removal plant - actual effluent concentrations are 4 TN and 0.05TP-- already included in current fee	\$0.00	\$0.00
0.63%	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$26.40	\$2,117,280.00

Lagoons

0.56%	lagoon to simple mechanical system - ref: Gary Swanson, consulting engineer- 15TN, 2TP	\$0.68	\$54,536.00
0.48%	4000 gallons. Base rate \$9.48 at 3000 gallons plus \$2.06 for next 1,000 gallons	#REF!	\$1,018,540.00

1.02%		\$15.25	\$1,261,145.00
0.58%		\$10.00	\$802,000.00
	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$10.00	\$802,000.00

Annual Operations costs to meet the approximate variance levels L4WERF	Annual Capital and Operations cost (\$)	Annual Additional Cost per Household (increase in sewer rate)	Predicted average household sewer fee to meet criteria	Expected % MHI to Meet Variance Numbers (plus current wastewater fees)
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0.00	\$0.00	\$0.00	\$216	0.47
0.00	\$0.00	\$0.00	\$372	0.79
109,500.00	\$1,581,972.00	\$128.23	\$394	0.75
1,125,000.00	\$3,290,400.00	\$234.34	\$594	1.48
\$0.0	\$0.00	\$0.00	\$152	0.38
\$949,000.0	\$7,766,000.00	\$323.61	\$511	1.26
\$949,000.0	\$7,766,000.00	\$185.61	\$404	0.90

\$73,000.00	\$1,436,400.00	\$484.35	\$1,084	3.04
\$459,900.00	\$2,240,340.00	\$589.56	\$826	2.20
\$238,000.00	\$1,031,980.00	\$496.14	\$772	3.07
\$150,000.00	\$350,500.00	\$150.74	\$538	1.70

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	100,000.00	\$706,312.00	\$1,350.50	\$1,713	3.38	
	0.00	\$0.00	\$0.00	\$532	1.37	
	643860	\$2,761,140.00	\$668.56	\$909	2.39	

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	7,300.00	\$61,836.00	\$154.98	\$355	0.99	
	7,300.00	\$1,025,840.00	\$795.22	\$934	3.22	

602,000.00	\$1,863,145.00	\$1,224.14	\$1,634	4.05
300,000.00	\$1,102,000.00	\$596.19	\$810	2.19
300,000.00	\$1,102,000.00	\$282.39	\$588	1.46

	Percent increase in Wastewater bill	2% MHI	Total additional annual amount town would spend total to get to 2% MHI	
	0%	\$911.88	\$6,967,150.56	\$6,967,150.56
	0%	\$941.30	\$8,319,750.20	\$8,319,750.20
	48%	\$1,046.34	\$9,633,963.30	\$9,633,963.30
	65%	\$801.10	\$6,193,485.10	\$6,193,485.10
	0%	\$802.60	\$18,401,513.40	\$18,401,513.40
	173%	\$808.68	\$14,914,277.04	\$14,914,277.04
	85%	\$900.08	\$28,527,193.80	\$28,527,193.80

	81%		
	373%		
		\$1,014.58	\$341,090.14
	0%		
		\$775.00	\$393,578.80
	279%		
	77%		
		\$716.12	\$205,931.88
	574%		
		\$580.00	\$569,560.80

299%		
	\$806.40	\$603,990.48

WERF

Level	Description	Capital Cost (\$/gpd)	Operations (\$1,000/yr/10 MG Treated)
Level 1	No N and P removal	9.3	250
Level 2	1 mg/l TP; 8 mg/l TN	12.7	350
Level 3	0.1-0.3 mg/l TP; 4-8 mg/l TN	14.4	640
Level 4	<0.1 mg/l TP; 3 mg/l TN	15.3	880
Level 5	<0.01 mg/l TP; 1 mg/l TN	21.8	1370

Costs to Meet Criteria	Capital Cost(\$million/MGD)	Design Flow	Facility Upgrade Capital Costs (\$million)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)
Kalispell	0	5.4	\$0.00	\$0.00
Bozeman	0	13.8	\$0.00	\$0.00
Helena	3.4	5.4	\$18.36	\$1.47
Butte	Actual Costs	1	\$27.00	\$2.17
Missoula				
Great Falls	3.4	25	\$85.00	6.817
Billings	3.4	25	\$85.00	\$6.82
Livingston	3.4	5	\$17.00	1.3634
Miles City	6	3.7	\$22.20	1.78044
Hamilton	5	1.98	\$9.90	0.79398
Lewistown	1	2.5	\$2.50	0.2005
Manhattan				
Columbia Falls	Actual Costs	0.766	\$3,927,688.00	\$315,000.58
Havre	6	4.4	\$26.40	2.11728
Philipsburg	3.4	0.2	\$0.68	\$0.05
Cut Bank				
Deer Lodge				
Glendive	10		\$10.00	0.802
Red Lodge				

Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)	Operations (\$1/ MG/day Treated)	Operations Costs (\$/ year/ 1 MGD)	Actual Flow	Facility Upgrade Operations Costs (\$/year/1 MGD) based on Facility MGD	Membrane Replacement Cost (\$24,000 /yr/1 MGD)*Actual Flow - not necessary b/c no RO
\$0.00	0	0.00	3.10	0.00	0.00
\$0.00	0	0.00	5.80	0.00	0.00
\$1,472,472.00	100	36,500.00	3.00	109,500.00	0.00
\$2,165,400.00	0	0.00	4.00	1,125,000.00	0.00
\$6,817,000.00	100	36,500.00	26	949,000.00	0.00
\$6,817,000.00	100	36,500.00	26.00	949,000.00	0.00
\$1,363,400.00	100	36,500.00	2.00	73,000.00	0.00
\$1,780,440.00	630	229,950.00	2	459,900.00	0.00
\$793,980.00		350,000	0.68	238,000.00	
\$200,500.00		100,000.00	1.5	150,000.00	

\$315,000.58	0	0.00	0.37	0.00	0.00
\$2,117,280.00	630	229,950.00	2.8	643,860.00	0.00
\$54,536.00	100	36,500.00	0.20	7,300.00	0.00

\$802,000.00		300,000		300,000	
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Total Operations costs including membrane replacement
0.00
0.00
109,500.00
1,125,000.00
\$949,000.00
949,000.00
\$73,000.00
\$459,900.00
238,000.00
150,000.00

\$0.00
\$643,860.00
7,300.00

300,000

	Community	Median Household Income (2010) - countywide MHI. Recommend updating for service area.	Population	Estimated Number of Households (Population / 2.5) based on 2000 Census	Current Average Annual Household Wastewater Bill	Design Flow (MGD)	Actual Flow (MGD)	Current wastewater MHI	Percent MHI needed to get to RO/Base Numeric Nutrient Criteria (including current fees)
	Kalispell	\$39,953.00	19,927	7,705	\$216.00	5.4	3.10	0.54%	#REF!
	Bozeman	\$41,661.00	37,280	14,614	\$372.00	13.8	5.80	0.89%	#REF!
	Helena	\$47,152.00	28,190	12,337	\$265.44	5.4	3.00	0.56%	#REF!
	Butte	\$37,335.00	33,525	14,041	\$360.00	8.5	4.00	0.96%	#REF!
	Billings	\$45,004.00	104,170	41,841	\$218.28	26	26	0.49%	#REF!
	Missoula	\$34,319.00	66,788	27,553	\$152.14	12	9	0.44%	#REF!
	Great Falls	\$40,718.00	58,505	23,998	\$187.20	26	26	0.46%	#REF!
	Livingston	\$35,689.00	7,044	3,188	\$600.00	5	2	1.68%	#REF!
	Miles City	\$37,554.00	8,410	3,518	\$236.10	3.7	2	0.63%	#REF!

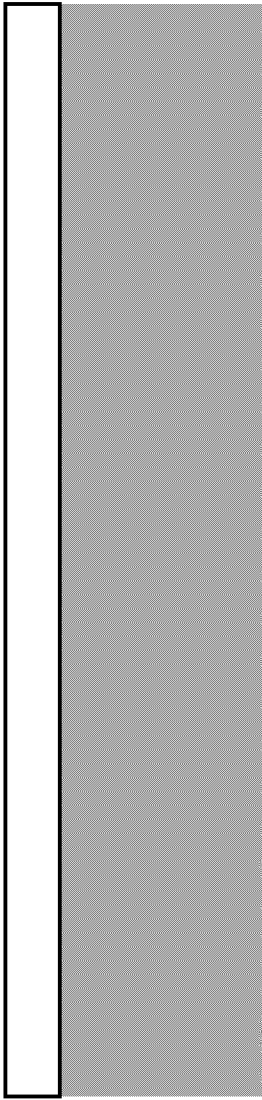
	Havre	\$43,577.00	9,310	3,709	\$240.00	1.8	1	0.55%	#REF!
	Columbia Falls	\$38,750.00	4,688	1,621	\$532.20	0.766	0.37	1.37%	#REF!
	Manhattan	\$50,729.00	1,520	523	\$362.40	0.6	0.4	0.71%	#REF!
	Lolo	\$46,442.00	3,892	1,060	\$363.00	0.34	0.38	0.78%	#REF!
	Stevensville	\$33,776.00	1,809	795	\$535.08	0.3	0.29	1.58%	#REF!

	Philipsburg	\$31,375.00	820	399	\$200.00	0.2		0.64%	#REF!
							0.2		
	Cut Bank	\$44,833.00	2,869	1,290	\$138.48	0.643	0.643	0.31%	#REF!
	Deer Lodge	\$40,320.00	3,111	1,522	\$409.56	3.3		1.02%	#REF!
	Glendive	\$42,821.00	4935	1,883	\$213.96	1.3	N/A	0.50%	#REF!

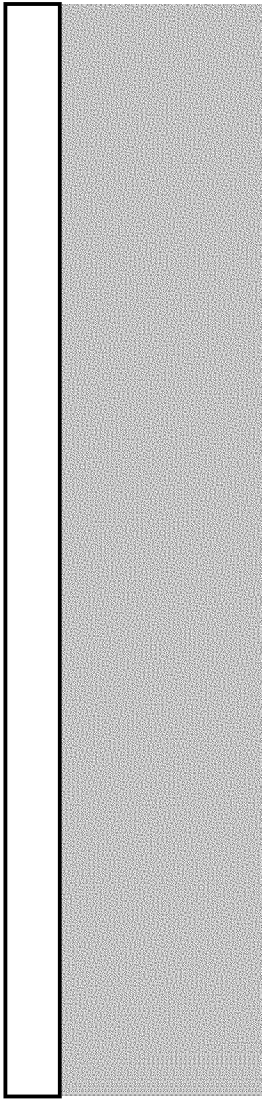
	Redlodge	\$50,123.00	2125	1,055	\$305.28	1.2		0.61%	#REF!
							0.65		

	Highwood	\$62,614.00	176	53	\$600.00	0.026		0.96%	#REF!
	Circle	\$29,000.00	615	234	\$259.56	0.16	0.015 0.065	0.90%	#REF!

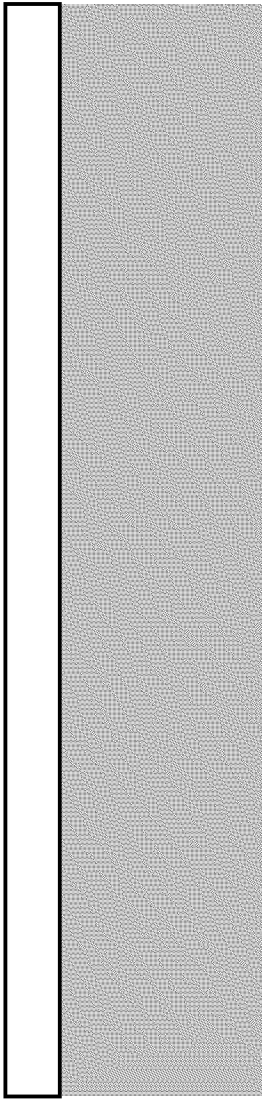
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Yellow fill = Greater than 2% MHI to reach to certain level of wastewater treatment



Orange fill = Greater than 100% increase in wastewater fee costs to reach to certain level of w



Blue Fill = Town already meets the standard so no new costs or treatment needed

Increase over current Wastewater Bill to Reach RO	Percent MHI needed to get to Variance in SB367 (including current fees)	Increase over current Wastewater Bill to Reach Variance	2% MHI per household	Total additional <u>annual</u> amount Town Would Need to Spend to get to 2% MHI
#REF!	0.47%	0%	\$799	\$4,492,477
#REF!	0.79%	0%	\$833	\$6,740,269
#REF!	0.75%	48%	\$943	\$8,359,551
#REF!	1.48%	65%	\$747	\$5,429,655
#REF!	0.90%	85%	\$900	\$28,527,194
#REF!	N/A	N/A	\$686	\$14,719,915
#REF!	1.26%	173%	\$814	\$15,050,586
#REF!			\$714	\$362,731
#REF!			\$751	\$1,811,700

#REF!

\$503

\$475,344

#REF!

\$635

\$673,514

#REF!				
#REF!	1.37%	0%	\$872	\$2,342,382
#REF!	3.38%	373%	\$775	\$393,579
#REF!			\$1,015	\$341,090
#REF!				

#REF!

\$1,002

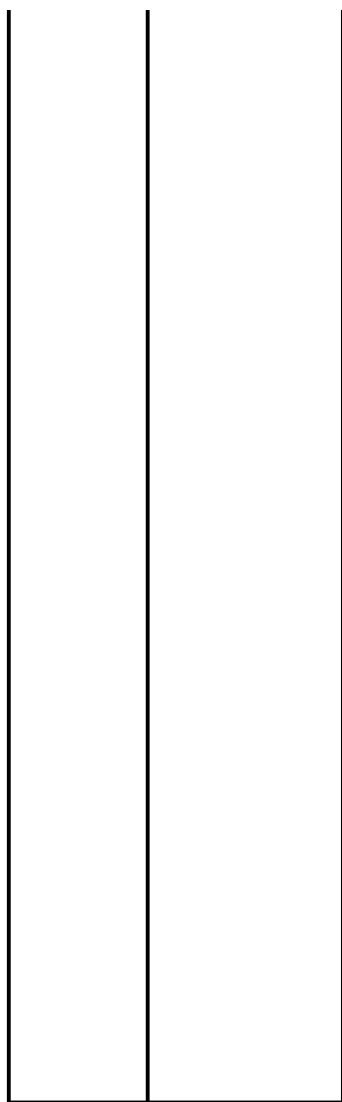
\$735,525

#REF!

\$888

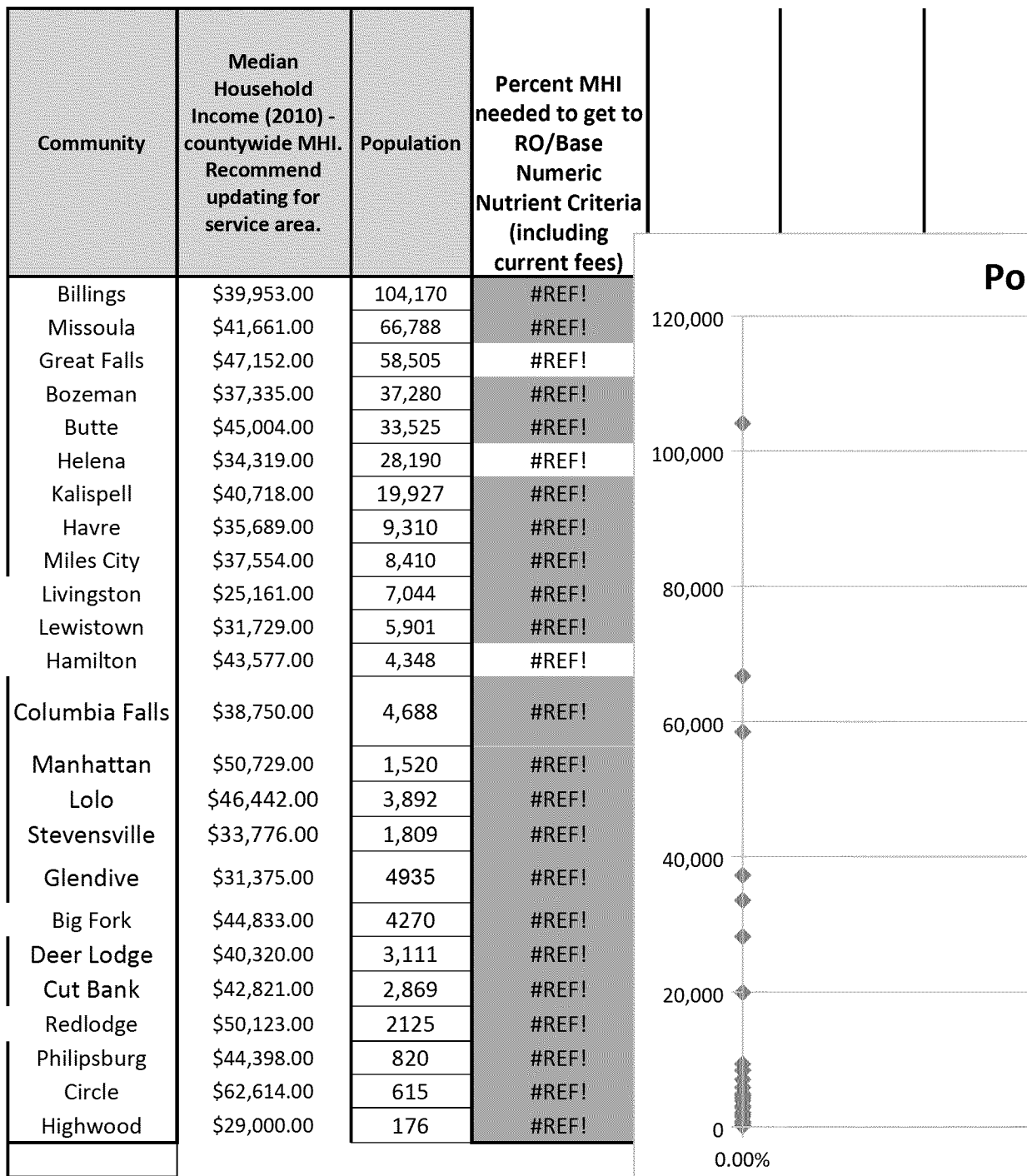
\$525,381

#REF!				
#REF!			\$1,252 \$580	\$34,571 \$74,983



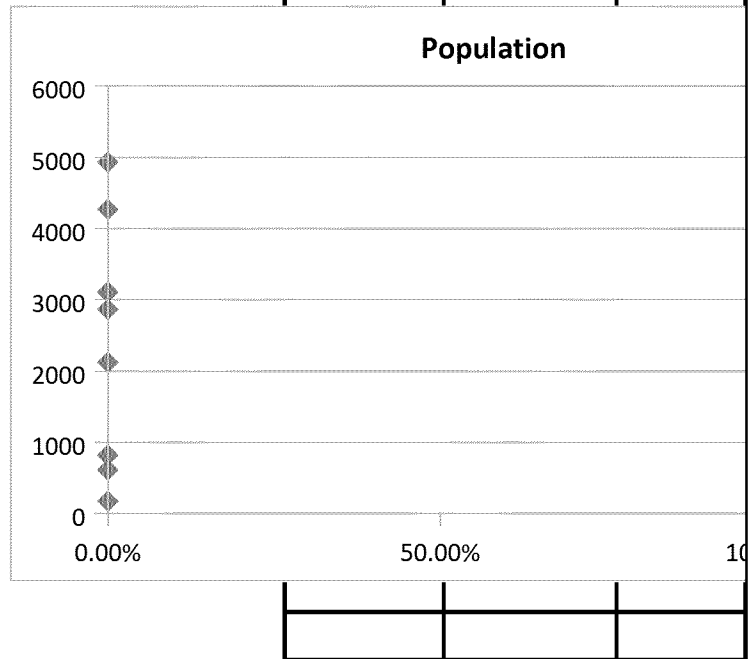
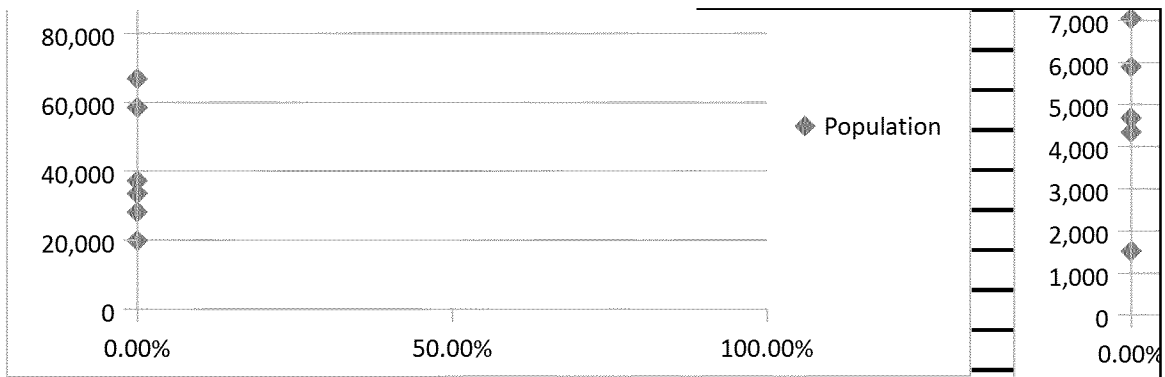
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Yellow fill = Greater than 2% MHI to reach to certain level of wastewater treatment
 Orange fill = Greater than 100% increase in wastewater fee costs to reach to certain level of waste
 Blue Fill = Town already meets the standard so no new costs or treatment needed



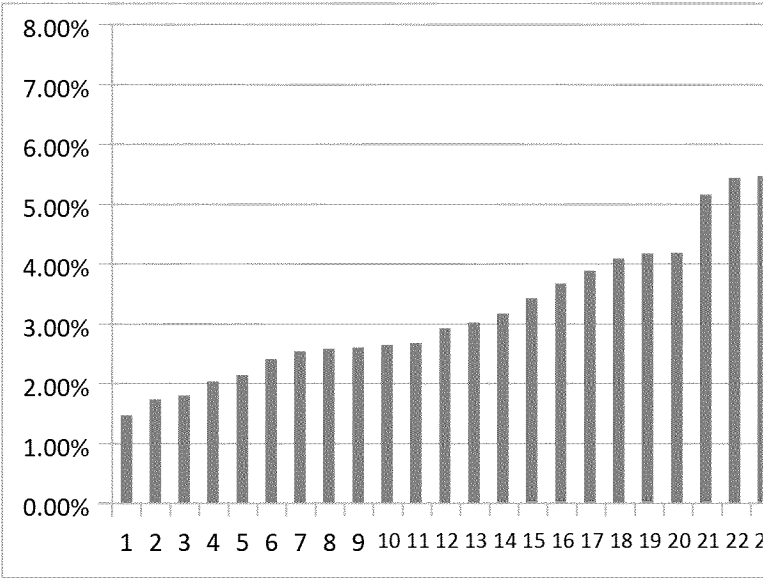


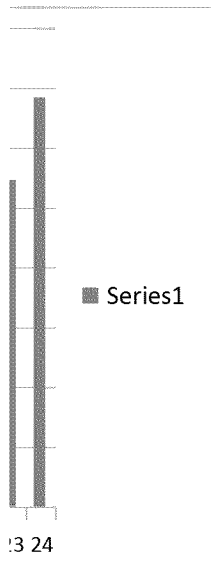
Population vs Percent MHI Needed to Reach Base Criteria

[illegible]

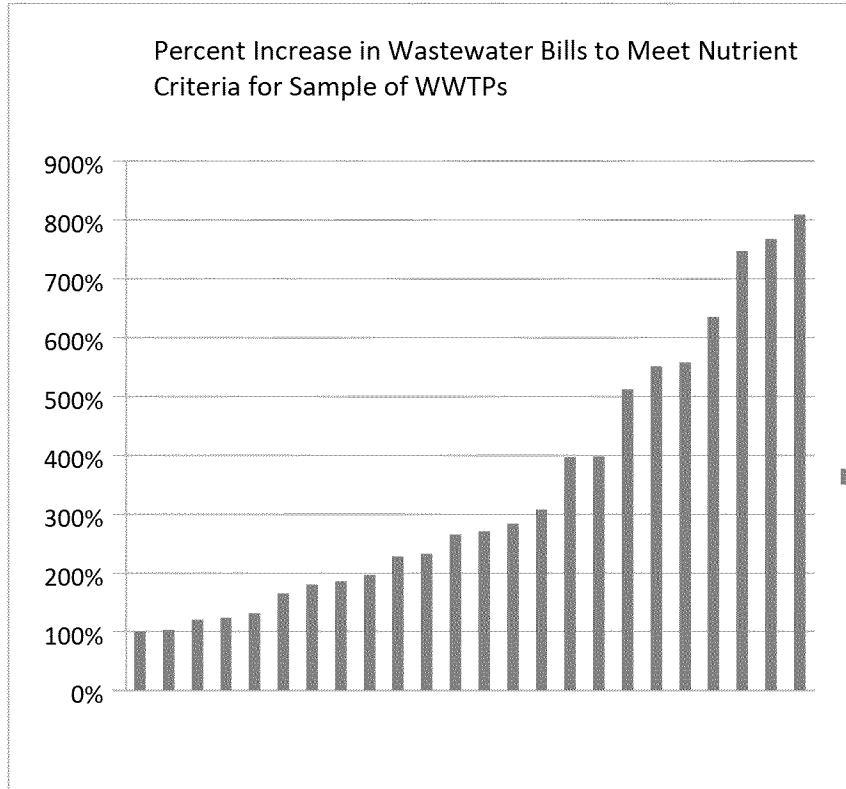
1.47%
1.74%
1.81%
2.04%
2.15%
2.41%
2.54%
2.58%
2.60%
2.65%
2.68%
2.92%
3.02%
3.17%
3.43%
3.67%
3.89%
4.09%
4.18%
4.19%
5.16%
5.44%
5.47%
6.85%

Total MHI% to meet nutrient criteria





100%
 103%
 120%
 123%
 131%
 165%
 180%
 186%
 196%
 228%
 232%
 264%
 270%
 283%
 307%
 396%
 398%
 511%
 551%
 557%
 635%
 747%
 767%
 808%





Community	Current Treatment Technology	Design Flow (MGD)	Actual Flow (MGD)	Capital cost (million dollars) to meet the numeric nutrient criteria (WERF)	Annual Capital cost to meet the numeric nutrient criteria (L4 WERF)
Big 7 Communities					
Kalispell	BNR (modified Johannesburg); 3.1 to 5.4 MGD; ~WERF Level 2--avg. .12 mg/l TP; 10 mg/l TN.	5.4	3.10	#REF!	#REF!
Bozeman	Some BNR now; 5-stage Barrdenpho; new plant will be ~WERF Level 2 on average--BNR (1 mg/l TP; 3 mg/l TN starting 2011); current 5.8 mgd; increasing to 13.9 mgd	13.8	5.80	#REF!	#REF!
Helena	BNR; ~ WERF Level 1--3 mg/l TP; 10 mg/l TN; design capacity of 5.4; current discharge ~3.0 MGD	5.4	3.00	#REF!	#REF!
Butte	Current technology is activated sludge (TN of 18.5 mg/l; TP of 2.11 mg/l); under Order to Construct to membrane BNR; current design is 8.5 MGD. Included in current fee is \$27 million upgrade in new capital costs and \$1.125 million in O&M costs which would bring them to 5 TN and 0.1 TP or ~WERF Level 3	8.5	4.00	#REF!	#REF!
Billings	Secondary treatment; Design flow of 26 MGD (avg.) and 40 MGD max. Costs are estimated from HDR.	26	26	312.50	#REF!
Missoula	Already meets nutrient criteria in Clark Fork with mixing zone. Advanced secondary treatment facility with biological nutrient removal and ultraviolet disinfection. 8.2 mg/l TN; 0.16 -0.4 mg/l TP; get a mixing zone, meeting criteria currently. BNR. Design flow = 12 MGD ; actual flow = 9 MGD. (designed for 10 and 1). (HDR)	12	9	#REF!	#REF!
Great Falls	At WERF 1. Conventional Secondary activated sludge (max 21-MGD; avg. 10 MGD). Cost data from HDR.	26	26	312.50	#REF!
Other Large Communities > 1 MGD					
Livingston	Assume WERF Level 1. Discharges into the Yellowstone; permit renewed in 2010; mechanical plant w/ 2 primary clarifiers, 3 rotating biological contactors, UV, installing co-composting. DMR shows 11 mg/l TN average (20 mg/l for May) and 2 mg/l TP (3 mg/l for May).	5	2	#REF!	#REF!

Miles City	Assume WERF 1. Secondary treatment plus oxidation ditch. 2011 permit. Algae plant study to remove nutrients. Extended aeration system w/2 oxidation ditches w/rotating brush aerators; 2 clarifiers and chlorine basin. TN avg of 23.5 mg/l; TP avg. 3.6 mg/l.	3.7	2	#REF!	#REF!
Hamilton	Assume WERF 2 (TN WERF 3 and TP WERF 1). BNR facility w/ extended aeration system. Oxidation ditch w/ rotating brush aerators. 3 clarifiers. Upgraded in 2010. TN avg. 5.5 mg/l; TP avg. 5 mg/l.	1.98	0.68	24.75	#REF!
Lewistown	Assume WERF 3 based on current levels. BNR plant. Focus on TP removal. 0.8 mg/l TP; 3-4 mg/l TN.	2.5	1.5	18.50	#REF!
Havre	Assumed WERF Level 1. Discharges into the Milk River. Permit renewed in 2011. Activated sludge facility with effluent chlorination. 2006-2010 data showed avg. TP of 3.4 (TN not required). 2011 DMR showed TN of 19.4 mg/l; Tp of 1.3 mg/l.	1.8	1.38	#REF!	#REF!
Non-Lagoon Facilities with < 1MGD					
Columbia Falls	Assume WERF Level 3. Newer plant with good control. Designed to achieve 8 mg/l TN	0.766	0.37	\$0.00	\$0
Manhattan	Assumed WERF Level 2. Discharges into Diva Ditch. Permit renewed in 2010. Denitrification with fixed film suspended growth system, clarifiers and aerobic sludge digestion, UV. DMR data from winter quarter shows 11 mg/l TN and 1 mg/l TP. 2008-2010 showed avg. TN of 14 mg/l TN and 4 mg/l TP.	0.6	0.4	\$0.00	\$0
Lolo	WERF Level 1. No steps towards nutrient removal. For Lolo, TN is generally less than 30 mg/l and TP less than 7. Generally heaving loadings for Lolo. Sewer rates--Lolo \$30.25-ish/mo - (RSID) based on property values	0.34	0.38	\$1.16	\$92,711
Stevensville	WERF Level 1. TN generally below 20 and TP less than 4.	0.3	0.29	\$1.02	\$81,804

Lagoons					
Philipsburg	WERF 1--Lagoon - ref: Gary Swanson, consulting engineer- 15TN, 2TP	0.2	0.2	#REF!	#REF!
Cut Bank	WERF 0--Lagoon.	0.643	0.643	#REF!	#REF!
Deer Lodge	WERF Level 0. Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork	3.3	1.06	#REF!	\$1,261,145.00
Glendive	WERF Level 0. Domestic WW lagoon; 3 cell facultative; current O&M costs are <\$; 8-10 capital costs for new plant. O&M increase of ~\$300,000. new avg. 1.15 MGD; PER completed to upgrade to mechanical SBR or BNR plant.	1.3	0.6	#REF!	#REF!
Red Lodge	WERF Level 0--Lagoon.	1.2	0.65	#REF!	#REF!
Big Fork	WERF Level 0--Lagoon.	0.5	0.3	#REF!	#REF!
Highwood	WERF Level 0--Lagoon.	0.026	0.015	#REF!	#REF!
Circle	WERF Level 0--Lagoon.	0.16	0.065	#REF!	#REF!

NOTE: Operation costs include energy and chemical costs only and do not include labor and maintenance cost. A

NOTE: The numbers are intended to provide ROUGH ESTIMATES for discussion purposes and do not reflect the s

NOTE: Capital costs were assumed to cover a 20-year bond with 5% interest (used 0.0802 conversion factor)

NOTE: MHI is based on data from Montana CEIC based on 2010 estimates.



Indicates rough estimates; need to verify

Big Fork number of household based on population divided by 2.5

	Annual Operations costs to meet the numeric nutrient criteria L4WERF	Annual Capital and Operations cost (\$)	Annual Additional Cost per Household (increase in sewer rate)	Predicted average household sewer fee to meet criteria	Expected % MHI to Meet Base Numeric Nutrient Criteria (plus current wastewater fees)	Percent increase in Wastewater bill
7 Communities						
	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
e Communities > 1 MGD						
	\$865,600	#REF!	#REF!	#REF!	#REF!	#REF!

#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!

on Facilities with < 1MGD

#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!

Lagoons

#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!

s such, these numbers are on the low side.
ite-specific conditions at each plant.

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265-6719 - City Office

Community	Current Treatment Technology	Would the criteria apply? Or is there dilution capability?	Design Flow (MGD)	Actual Flow (MGD)	Community Population (Census 2010)	Number of Households (American Community Survey 2005-2009)
Big 7 Communities						
Kalispell	BNR (modified Johannesburg); 3.1 to 5.4 MGD; avg. .12 mg/l TP; 10 mg/l TN.	Yes. EOP; Ashley Creek	5.4	3.10	19,927	7,705
Bozeman	some BNR now; 5-stage Barrdenpho; new plant will be BNR (1 mg/l TP; 3 mg/l TN starting in 2011); current 5.8 MGD; increasing to 13.9 mgd	Yes. Also Gallatin TMDL in the works.	13.8	5.80	37,280	14,614
Helena	BNR; 3 mg/l TP; 10 mg/l TN; design capacity of 5.4; current discharge ~3.0 MGD	Yes. WLA set in TMDL based on numeric criteria.	5.4	3.00	28,190	12,337
Butte	Current technology is activated sludge (TN of 18.5 mg/l; TP of 2.11 mg/l); under Order to Construct to membrane BNR; current design is 8.5 MGD; talking about lowering to 6.1 MGD. Sewer Fee based on DEQ estimates. Included in current fee is \$27 million upgrade in new capital costs and \$1.125 million in O&M costs which would bring them to 5 TN and 0.1 TP	Yes. EOP.	8.5	4.00	33,525	14,041
Billings	2ndary treatment; Design flow of 26 MGD (avg.) and 40 MGD max.	Yes. Discharge into the Yellowstone River.	26	26	104,170	41,841
Missoula	advanced secondary treatment facility with biological nutrient removal and ultraviolet disinfection; meets Clark Fork criteria w/ mixing zone. 8.2 mg/l TN; 0.16 -0.4 mg/l TP; get a mixing zone, meeting criteria currently. BNR. Design flow = 12 MGD ; actual flow = 9 MGD. (designed for 10 and 1). (HDR)	Yes. With mixing zone. Currently meeting criteria after mixing zone.	12	9	66,788	27,553

Great Falls	conventional 2ndary activated sludge (max 21-MGD; avg. 10 MGD)	Yes. Missouri River	26	26	58,505	23,998
Other Large Communities > 1 MGD						
Livingston	discharges into the Yellowstone; permit renewed in 2010; mechanical plant w/ 2 primary clarifiers, 3 rotating biological contactors, UV, installing co-composting. DMR shows 11 mg/l TN average (20 mg/l for May) and 2 mg/l TP (3 mg/l for May).	Yes. Discharge into the Yellowstone River.	5	2	7,044	3,188
Miles City	2ndary treatment plus oxidation ditch. 2011 permit. Algae plant study to remove nutrients. Extended aeration system w/2 oxidation ditches w/rotating brush aerators; 2 clarifiers and chlorine basin. TN avg of 23.5 mg/l; TP avg. 3.6 mg/l.	Yes. Discharge into the Yellowstone River.	3.7	2	8,410	3,518
Hamilton	BNR facility. t w/ extended aeration system. Oxidation ditch w/ rotating brush aerators. 3 clarifiers. Upgraded in 2010. TN avg. 5.5 mg/l; TP avg. 5 mg/l.	Yes	1.98	0.68	4,348	2,092
Lewistown	BNR plant. Focus on TP removal. 0.8 mg/l TP; 3-4 mg/l TN.	Yes	2.5	1.5	5,901	2,727
Havre	Discharges into the Milk River. Permit renewed in 2011. Activated sludge facility with effluent chlorination. 2006-2010 data showed avg. TP of 3.4 (TN not required). 2011 DMR showed TN of 19.4 mg/l; Tp of 1.3 mg/l.	Yes	1.8	1.38	9,310	3,709
Non-Lagoon Facilities with < 1MGD						
Columbia Falls	Newer plant. Designed to achieve 8 mg/l TN	Yes	0.766	0.37	4,688	1,621

Manhattan	Discharges into Diva Ditch. Permit renewed in 2010. Denitrification with fixed film suspended growth system, clarifiers and aerobic sludge digestion, UV. DMR data from winter quarter shows 11 mg/l TN and 1 mg/l TP. 2008-2010 showed avg. TN of 14 mg/l TN and 4 mg/l TP.	Yes	0.6	0.4	1,520	523
Lolo	No steps towards nutrient removal. For Lolo, TN is generally less than 30 mg/l and TP less than 7. Generally heaving loadings for Lolo. Sewer rates--Lolo \$30.25-ish/mo - (RSID) based on property values	Yes	0.34	0.38	3,892	1,060
Stevensville	Stevensville is generally a little better with TN generally below 20 and TP less than 4.	Yes	0.3	0.29	1,809	795
Lagoons						
Philipsburg	lagoon - ref: Gary Swanson, consulting engineer- 15TN, 2TP	Yes.	0.2	0.2	820	399
Cut Bank	Lagoon.	Yes	0.643	0.643	2,869	1,290
Deer Lodge	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork	Yes	3.3	1.06	3,111	1,522
Glendive	domestic WW lagoon; 3 cell facultative; current O&M costs are <\$; 8-10 capital costs for new plant. O&M increase of ~\$300,000. new avg. 1.15 MGD; PER completed to upgrade to mechanical SBR or BNR plant.	Yes	1.3	0.6	4935	1883

Median Household Income (2010) - American Community Survey.	Current average household sewer bill per year (2008 / 2011)	Current average sewer fee as % of MHI	Notes	Capital cost (million dollars) to meet the numeric nutrient criteria (WERF)	Annual Capital cost to meet the numeric nutrient criteria (L4 WERF)	Annual Operations costs to meet the numeric nutrient criteria L4WERF	Annual Capital and Operations cost (\$)
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Big 7 Communities

\$39,953.00	\$361.68	0.91%	Sewer rates obtained from City in 2011. Plant ~WERF Level 2. \$30.14/month Based on a base rate of \$15.00 with a usage rate of \$4.19/1000 gal of water used	49.14	\$3,941,028	\$1,228,530	\$5,169,558
\$41,661.00	\$372.00	0.89%	Sewer rates obtained from City in 2011. Plant ~WERF Level 2. Really Level 3 for TN and 1 for TP	125.58	\$10,071,516	\$2,298,540	\$12,370,056
\$47,152.00	\$277.80	0.59%	Sewer rates obtained from City in 2011. Plant ~ WERF Level 1.	67.50	\$5,413,500	\$1,298,400	\$6,711,900
\$37,335.00	\$360.00	0.96%	Sewer Fee based on DEQ estimates. While current monthly fee is \$13.50, the \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP (WERF 3) would raise rates to \$30 per month	62.90	\$5,044,580	\$1,161,800	\$6,206,380
\$45,004.00	\$218.28	0.49%	The numbers for Billings and Great Falls (treatment levels, treatment costs etc.) were obtained from HDR.	312.50	\$25,062,500	\$11,252,800	\$36,315,300
\$34,319.00	\$152.14	0.44%	Sewer rates obtained from city. 2011 values.	88.80	\$7,121,760	\$2,614,050	\$9,735,810

\$40,718.00	\$187.20	0.46%	At WERF 1. The numbers for Billings and Great Falls (population, treatment levels, etc.) were obtained from HDR.	312.50	\$25,062,500	\$11,252,800	\$36,315,300
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Other Large Communities > 1 MGD

\$35,689.00	\$600.00	1.68%	Assume WERF Tier 1	62.50	\$5,012,500	\$865,600	\$5,878,100
\$37,554.00	\$236.10	0.63%	Assume WERF Tier 1	46.25	\$3,709,250	\$865,600	\$4,574,850
\$25,161.00	\$276.00	1.10%	Assume WERF 2 (since TN gets to WERF 3 and TP WERF 1)	24.75	\$1,984,950	\$301,984	\$2,286,934
\$31,729.00	\$387.60	1.22%	Assume WERF 3 based on current treatment levels	18.50	\$1,483,700	\$423,675	\$1,907,375
\$43,577	\$240.00	0.55%	Assumed WERF Level 1 and 5,000 gallons usage. Rate is \$9.15 flat plus \$2.15 per 1,000 gallons	\$22.50	\$1,804,500	\$597,264	\$2,401,764

Non-Lagoon Facilities with < 1MGD

\$38,750	\$532.20	1.37%	Upgrade to RO	\$5.67	\$454,606	\$580,900	\$1,035,506
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\$50,729	\$362.40	0.71%	Assumed WERF Level 2. Correct? Paul.	\$5.46	\$437,892	\$63,408	\$501,300
\$46,442	\$363.00	0.78%	Level 1.	\$4.25	\$340,850	\$164,464	\$505,314
\$33,776	\$535.08	1.58%		\$3.75	\$300,750	\$125,512	\$426,262

Lagoons

\$31,375.00	\$200.00	0.64%	Assume WERF 1	\$4.36	\$ 349,672.00	94,810.00	\$444,482.00
\$44,833	\$138.48	0.31%	4000 gallons. Base rate \$9.48 at 3000 gallons plus \$2.06 for next 1,000 gallons	\$14.02	\$ 1,124,195.48	246,140.40	\$1,370,335.88
\$40,320	\$409.56	1.02%	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork	\$71.94	\$1,261,145.00	\$502,493.00	\$1,763,638.00
\$42,821	\$213.96	0.50%		\$28.34	\$2,272,868.00	\$284,430.00	\$2,557,298.00

\$50,123	305.28	0.61%	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$26.16	\$2,098,032.00	\$308,132.50	\$2,406,164.50
\$44,398	580.36	1.31%		\$10.90	\$874,180.00	\$142,215.00	\$1,016,395.00
\$62,614	600.00	0.96%		\$0.57	\$45,457.36	\$7,110.75	\$52,568.11
\$29,000	259.56	0.90%		\$3.49	\$279,737.60	\$30,813.25	\$310,550.85

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	Annual Additional Cost per Household (increase in sewer rate)	Predicted average household sewer fee to meet criteria	Expected % MHI to Meet Base Numeric Nutrient Criteria (plus current wastewater fees)	Percent increase in Wastewater bill		
	\$671	\$1,033	2.58	186%		
	\$846	\$1,218	2.92	228%		
	\$544	\$822	1.74	196%		
	\$442	\$802	2.15	123%		
	\$868	\$1,086	2.41	398%		
	\$353	\$505	1.47	232%		

	\$1,513	\$1,700	4.18	808%		
	\$1,844	\$2,444	6.85	307%		
	\$1,300	\$1,537	4.09	551%		
	\$1,093	\$1,369	5.44	396%		
	\$699	\$1,087	3.43	180%		
	\$648	\$888	2.04	270%		
					265-6719 - City Office	
	\$639	\$1,171	3.02	120%		

\$959	\$1,321	2.60	264%		
\$477	\$840	1.81	131%		
\$536	\$1,071	3.17	100%		
	\$1,113.99	\$1,314	4.19	557%	
	\$1,062.28	\$1,201	2.68	767%	
	\$1,158.76	\$1,568	3.89	283%	
	\$1,358.10	\$1,572	3.67	635%	

\$2,280.72	\$2,586	5.16	747%		
\$595.08	\$1,175	2.65	103%		
\$991.85	\$1,592	2.54	165%		
\$1,327.14	\$1,587	5.47	511%		

WERF

Level	Description	Capital Cost (\$/gpd)	Operations (\$1/ MG/day Treated)
Level 1	No N and P removal	9.3	250
Level 2	1 mg/l TP; 8 mg/l TN	12.7	350
Level 3	0.1-0.3 mg/l TP; 4-8 mg/l TN	14.4	640
Level 4	<0.1 mg/l TP; 3 mg/l TN	15.3	880
Level 5	<0.01 mg/l TP; 1 mg/l TN	21.8	1370

Costs to Meet Criteria	Capital Cost(\$million/MGD)	Design Flow	Facility Upgrade Capital Costs (\$million)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)
Kalispell	9.1	5.4	\$49.14	\$3.94
Bozeman	9.1	13.8	\$125.58	\$10.07
Helena	12.5	5.4	\$67.50	\$5.41
Butte	7.4	8.5	\$62.90	\$5.04
Billings	12.5	25	\$312.50	\$25.06
Missoula	7.4	12	\$88.80	7.12176
Great Falls	12.5	25	\$312.50	25.0625
Livingston	12.5	5	\$62.50	\$5.01
Miles City	12.5	3.7	\$46.25	\$3.71
Hamilton	12.5	1.98	\$24.75	1.98495
Lewistown	7.4	2.5	\$18.50	1.4837
Havre	12.5	1.8	\$22.50	1.8045
Columbia Falls	7.4	0.766	\$5.67	0.45461
Manhattan	9.1	0.6	\$5.46	0.43789
Lolo	12.5	0.34	\$4.25	0.34085
Stephensville	12.5	0.3	\$3.75	0.30075
Philipsburg	21.8	0.2	\$4.36	\$0.35
Cut Bank	21.8	0.643	\$14.02	\$1.12
Deer Lodge	21.8	3.3	\$71.94	\$5.77
Glendive	21.8	1.3	\$28.34	2.27287
Red Lodge	21.8	1.2	\$26.16	2.09803
Big Fork	21.8	0.5	\$10.90	0.87418
Highwood	21.8	0.026	\$0.57	0.04546
Circle	21.8	0.16	\$3.49	0.27974

Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)	Operations (\$1/ MG/day Treated)	Operations Costs (\$/ year/ 1 MGD)	Actual Flow	Facility Upgrade Operations Costs (annual) based on Facility MGD	Membrane Replacement Cost (\$24,000 /yr/1 MGD)* Actual Flow
\$3,941,028.00	1020	372,300.00	3.10	1,154,130.00	74,400.00
\$10,071,516.00	1020	372,300.00	5.80	2,159,340.00	139,200.00
\$5,413,500.00	1120	408,800.00	3.00	1,226,400.00	72,000.00
\$5,044,580.00	730	266,450.00	4.00	1,065,800.00	96,000.00
\$25,062,500.00	1120	408,800.00	26.00	10,628,800.00	624,000.00
\$7,121,760.00	730	266,450.00	9.00	2,398,050.00	216,000.00
\$25,062,500.00	1120	408,800.00	26	10,628,800.00	624,000.00
\$5,012,500.00	1120	408,800.00	2.00	817,600.00	48,000.00
\$3,709,250.00	1120	408,800.00	2.00	817,600.00	48,000.00
\$1,984,950.00	1120	408,800.00	0.68	277,984.00	24,000.00
\$1,483,700.00	730	266,450.00	1.50	399,675.00	24,000.00
\$1,804,500.00	1120	408,800.00	1.38	564,144.00	33,120.00
\$454,605.68	730	266,450.00	2.00	532,900.00	48,000.00
\$437,892.00	1020	372,300.00	0.16	59,568.00	3,840.00
\$340,850.00	1120	408,800.00	0.38	155,344.00	9,120.00
\$300,750.00	1120	408,800.00	0.29	118,552.00	6,960.00
\$349,672.00	1370	450,050.00	0.20	90,010.00	4,800.00
\$1,124,195.48	1120	358,800.00	0.64	230,708.40	15,432.00
\$5,769,588.00	1370	450,050.00	1.06	477,053.00	25,440.00
\$2,272,868.00	1370	450,050.00	0.6	270,030.00	14,400.00
\$2,098,032.00	1370	450,050.00	0.65	292,532.50	15,600.00
\$874,180.00	1370	450,050.00	0.30	135,015.00	7,200.00
\$45,457.36	1370	450,050.00	0.015	6,750.75	360.00
\$279,737.60	1370	450,050.00	0.065	29,253.25	1,560.00

Total Operations costs including membrane replacement
1,228,530.00
2,298,540.00
1,298,400.00
1,161,800.00
11,252,800.00
2,614,050.00
\$11,252,800.00
\$865,600.00
\$865,600.00
301,984.00
423,675.00
\$597,264.00
\$580,900.00
\$63,408.00
\$164,464.00
\$125,512.00
\$94,810.00
\$246,140.40
\$502,493.00
\$284,430.00
\$308,132.50
\$142,215.00
\$7,110.75
\$30,813.25

Community	Current Treatment Technology
> 1 MGD	
Kalispell	Already below variance levels; achieving avg. 0.12 mg/l TP and 10 mg/l TN. Town expected to pay an addition \$6,967,150.56 annually to achieve 2% MHI.
Bozeman	Already below variance levels; should be close to achieving 1 mg/l TP and 3 -5 mg/l TN starting in 2011/2-12. Town expected to pay an additional \$8,319,750.2 annually to achieve 2% MHI.
Helena	After optimization study, should be achieving variance levels. Currently at 3 mg/l TP and 10 mg/l TN. Town expected to pay an additional \$9,633,963.3 annually to achieve 2%MHI.
Butte	Under Order to Construct to membrane BNR Will already meet variance levels after upgrade. The \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP. Upgrade would result in 1.5% MHI. Additional costs needed?
Missoula	Already meets Clark Fork criteria w/ mixing zone. Achieving 8.2 mg/l TN; 0.16 -0.4 mg/l TP. Would the town be expected to pay more (~\$18 million annually) towards 2% MHI or not since they are achieving the criteria?
Great Falls	Conventional 2ndary activated sludge (max 21-MGD; avg. 10 MGD). Based on Billings case study, likely long-term variance limits of Level 4 for WERF (0-.1 mg/l TP; 3 mg/l TN)
Billings	2ndary treatment; Design flow of 26 MGD (avg.) and 40 MGD max. Based on Billings case study, likely long-term variance limits of Level 4 for WERF (0-.1 mg/l TP; 3 mg/l TN)

Livingston	Based on existing high costs, likely that meeting 1 mg/l and 10 TN would be the feasible limits. MHI of 3.05 percent to achieve WERF level 3.
Miles City	2011 permit; calculated variance limits to <0.1 mg/l TP; 3 mg/l TN
Hamilton	BNR facility. t w/ extended aeration system. Oxidation ditch w/ rotating brush aerators. 3 clarifiers. Upgraded in 2010.
Lewistown	Already below variance levels;BNR plant. Lready below proposed interim effluent limits (0.8 mg/l TP; 3-4 mg/l TN).
Facilities with < 1MGD	
Manhattan	Discharges into Diva Ditch. Permit renewed in 2010. Denitrification with fixed film suspended growth system, clarifiers and aerobic sludge digestion, UV. DMR data from winter quarter shows 11 mg/l TN and 1 mg/l TP. 2008-2010 showed avg. TN of 14 mg/l TN and 4 mg/l TP.
Columbia Falls	Columbia Falls already meets variance level standards. Actual cost of \$3,927,688
Havre	Discharges into the Milk River. Permit renewed in 2011. Activated sludge facility with effluent chlorination. 2006-2010 data showed avg. TP of 3.4 (TN not required). 2011 DMR showed TN of 19.4 mg/l; Tp of 1.3 mg/l.
Lagoons	
Philipsburg	lagoon to simple mechanical system - ref: Gary Swanson, consulting engineer- 15TN, 2TP; Do we have actual costs for the upgrade?
Cut Bank	

Deer Lodge	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork
Glendive	Upgrade from a lagoon to mechanical plant - BNR or otherwise would result in > 2%MHI
Redlodge	Upgrade from a lagoon to mechanical plant - BNR or otherwise would result in >1.5% MHI

2% MHI information
draft numbers pending input

Flow Category	Community Population	Number of Households (Population / 2.5) based on 2000 Census	Median Household Income (2010) - countywide MHI. Recommend updating for service area.	Current average household sewer bill per year (2008 / 2011)
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> 1 MGD (1 mg/l TP; 10 mg/l TN)	27,544	10,012	\$45,594.00	\$216.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	37,280	14,614	\$47,065.00	\$372.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	28,190	12,337	\$52,317.00	\$265.44
> 1 MGD (1 mg/l TP; 10 mg/l TN)	33,525	14,041	\$40,055.00	\$360.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	108,623	28,290	\$40,130.00	\$152.14
> 1 MGD (1 mg/l TP; 10 mg/l TN)	82,178	23,998	\$40,434.00	\$187.20
> 1 MGD (1 mg/l TP; 10 mg/l TN)	104,170	41,841	\$45,004.00	\$218.28

> 1 MGD (1 mg/l TP; 10 mg/l TN)	7414	2965.6	35,689	\$600.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	9500	3800	37,554	\$236.10
> 1 MGD (1 mg/l TP; 10 mg/l TN)	5,200	2080	25,161	\$276.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	5,813	2,325	31,729	\$387.60

Facilities with

Yes	1,520	523	\$50,729	\$362.40
Yes- but Columbia Falls already meets it	4,688	1,621	\$38,750	\$532.20
	10,325.00	4130	\$38,082	240.00

Yes.	820	399	35806.00	200
Yes	2,869	1,290	\$29,000	\$138.48

Yes	3,111	1,522	\$40,320	\$409.56
	4621.00	1848.40	37000.00	213.96
	9,756.00	3,902	\$40,379	305.28

Current average sewer fee as % of MHI	Notes	Capital cost (million dollars) to meet the approximate variance levels (WERF)	Annual Capital cost to meet the approximate variance levels (L4 WERF)
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> 1 MGD

0.47%	Already meeting variance levels. Sewer rates obtained from City in 2011. Plant ~WERF Level 2.	\$0.00	\$0.00
0.79%	Already meeting variance levels. Sewer rates obtained from City in 2011. Plant ~WERF Level 2. Really Level 3 for TN and 1 for TP	\$0.00	\$0.00
0.51%	Sewer rates obtained from City in 2011. Plant ~ WERF Level 1.	\$18.36	\$1,472,472.00
0.90%	Will already meet variance levels after upgrade. While current monthly fee is \$13.50, the \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP would raise rates to \$30 per month	\$27.00	\$2,165,400.00
0.38%	Already meets variance levels	\$0.00	\$0.00
0.46%	and Great Falls (treatment levels, cost, etc.) were obtained from HDR.	\$85.00	\$6,817,000.00
0.49%	and Great Falls (treatment levels, cost, etc.) were obtained from HDR.	\$85.00	\$6,817,000.00

1.68%		17.00	1,363,400.00
0.63%		22.20	1,780,440.00
1.10%		5.00	793,980.00
1.22%		1.00	200,500.00

Facilities with < 1MGD

0.71%	Mainly designed to remove ammonia and some TN, but now have NO3 limit. May be able to meet with operational changes. TP of 2 mg/l may require more capital & O&M expenses. Ref: planning document, SRF loan application	\$7.56	\$606,312.00
1.37%	Upgrade to an existing Chemical P-removal plant - actual effluent concentrations are 4 TN and 0.05TP-- already included in current fee	\$0.00	\$0.00
0.63%	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$26.40	\$2,117,280.00

Lagoons

0.56%	lagoon to simple mechanical system - ref: Gary Swanson, consulting engineer- 15TN, 2TP	\$0.68	\$54,536.00
0.48%	4000 gallons. Base rate \$9.48 at 3000 gallons plus \$2.06 for next 1,000 gallons	\$21.80	\$1,018,540.00

1.02%		\$15.25	\$1,261,145.00
0.58%		\$10.00	\$802,000.00
	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$10.00	\$802,000.00

Annual Operations costs to meet the approximate variance levels L4WERF	Annual Capital and Operations cost (\$)	Annual Additional Cost per Household (increase in sewer rate)	Predicted average household sewer fee to meet criteria	Expected % MHI to Meet Variance Numbers (plus current wastewater fees)
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0.00	\$0.00	\$0.00	\$216	0.47
0.00	\$0.00	\$0.00	\$372	0.79
109,500.00	\$1,581,972.00	\$128.23	\$394	0.75
1,125,000.00	\$3,290,400.00	\$234.34	\$594	1.48
\$0.0	\$0.00	\$0.00	\$152	0.38
\$949,000.0	\$7,766,000.00	\$323.61	\$511	1.26
\$949,000.0	\$7,766,000.00	\$185.61	\$404	0.90

\$73,000.00	\$1,436,400.00	\$484.35	\$1,084	3.04
\$459,900.00	\$2,240,340.00	\$589.56	\$826	2.20
\$238,000.00	\$1,031,980.00	\$496.14	\$772	3.07
\$150,000.00	\$350,500.00	\$150.74	\$538	1.70

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	100,000.00	\$706,312.00	\$1,350.50	\$1,713	3.38	
	0.00	\$0.00	\$0.00	\$532	1.37	
	643860	\$2,761,140.00	\$668.56	\$909	2.39	

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	7,300.00	\$61,836.00	\$154.98	\$355	0.99	
	7,300.00	\$1,025,840.00	\$795.22	\$934	3.22	

602,000.00	\$1,863,145.00	\$1,224.14	\$1,634	4.05
300,000.00	\$1,102,000.00	\$596.19	\$810	2.19
300,000.00	\$1,102,000.00	\$282.39	\$588	1.46

	Percent increase in Wastewater bill	2% MHI	Total additional annual amount town would spend total to get to 2% MHI	
	0%	\$911.88	\$6,967,150.56	\$6,967,150.56
	0%	\$941.30	\$8,319,750.20	\$8,319,750.20
	48%	\$1,046.34	\$9,633,963.30	\$9,633,963.30
	65%	\$801.10	\$6,193,485.10	\$6,193,485.10
	0%	\$802.60	\$18,401,513.40	\$18,401,513.40
	173%	\$808.68	\$14,914,277.04	\$14,914,277.04
	85%	\$900.08	\$28,527,193.80	\$28,527,193.80

	81%		
	373%		
		\$1,014.58	\$341,090.14
	0%		
		\$775.00	\$393,578.80
	279%		
	77%		
		\$716.12	\$205,931.88
	574%		
		\$580.00	\$569,560.80

299%		
	\$806.40	\$603,990.48

WERF

Level	Description	Capital Cost (\$/gpd)	Operations (\$1,000/yr/10 MG Treated)
Level 1	No N and P removal	9.3	250
Level 2	1 mg/l TP; 8 mg/l TN	12.7	350
Level 3	0.1-0.3 mg/l TP; 4-8 mg/l TN	14.4	640
Level 4	<0.1 mg/l TP; 3 mg/l TN	15.3	880
Level 5	<0.01 mg/l TP; 1 mg/l TN	21.8	1370

Costs to Meet Criteria	Capital Cost (\$million/MGD)	Design Flow	Facility Upgrade Capital Costs (\$million)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)
Kalispell	0	5.4	\$0.00	\$0.00
Bozeman	0	13.8	\$0.00	\$0.00
Helena	3.4	5.4	\$18.36	\$1.47
Butte	Actual Costs	1	\$27.00	\$2.17
Missoula				
Great Falls	3.4	25	\$85.00	6.817
Billings	3.4	25	\$85.00	\$6.82
Livingston	3.4	5	\$17.00	1.3634
Miles City	6	3.7	\$22.20	1.78044
Hamilton	5	1.98	\$9.90	0.79398
Lewistown	1	2.5	\$2.50	0.2005
Manhattan				
Columbia Falls	Actual Costs	0.766	\$3,927,688.00	\$315,000.58
Havre	6	4.4	\$26.40	2.11728
Philipsburg	3.4	0.2	\$0.68	\$0.05
Cut Bank				
Deer Lodge				
Glendive	10		\$10.00	0.802
Red Lodge				

Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)	Operations (\$1/ MG/day Treated)	Operations Costs (\$/ year/ 1 MGD)	Actual Flow	Facility Upgrade Operations Costs (\$/year/1 MGD) based on Facility MGD	Membrane Replacement Cost (\$24,000 /yr/1 MGD)*Actual Flow - not necessary b/c no RO
\$0.00	0	0.00	3.10	0.00	0.00
\$0.00	0	0.00	5.80	0.00	0.00
\$1,472,472.00	100	36,500.00	3.00	109,500.00	0.00
\$2,165,400.00	0	0.00	4.00	1,125,000.00	0.00
\$6,817,000.00	100	36,500.00	26	949,000.00	0.00
\$6,817,000.00	100	36,500.00	26.00	949,000.00	0.00
\$1,363,400.00	100	36,500.00	2.00	73,000.00	0.00
\$1,780,440.00	630	229,950.00	2	459,900.00	0.00
\$793,980.00		350,000	0.68	238,000.00	
\$200,500.00		100,000.00	1.5	150,000.00	

\$315,000.58	0	0.00	0.37	0.00	0.00
\$2,117,280.00	630	229,950.00	2.8	643,860.00	0.00
\$54,536.00	100	36,500.00	0.20	7,300.00	0.00

\$802,000.00		300,000		300,000	
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Total Operations costs including membrane replacement
0.00
0.00
109,500.00
1,125,000.00
\$949,000.00
949,000.00
\$73,000.00
\$459,900.00
238,000.00
150,000.00

\$0.00
\$643,860.00
7,300.00

300,000

	Community	Median Household Income (2009) - ACS	Current wastewater MHI %	Percent MHI Needed to get to WERF Level 2	Percent MHI Needed to get to WERF Level 3	Percent increase in current wastewater bill to get to WERF 3
	More Than 1 MGD					
	Kalispell	\$39,023	0.55%	0.55%	0.91%	63.95%
	Bozeman	\$42,218	0.88%	0.88%	1.29%	45.90%
	Helena	\$46,313	0.57%	0.85%	1.03%	80.49%
	Butte	\$38,178	0.94%	0.94%	0.94%	0.00%
	Billings	\$46,433	0.47%	0.87%	1.19%	152.49%
	Missoula	\$36,547	0.42%	0.42%	0.42%	0.00%
	Great Falls	\$40,935	0.46%	1.25%	1.87%	310.00%
	Livingston	\$33,937	1.77%	3.10%	3.92%	121.80%
	Miles City	\$37,268	0.63%	1.46%	2.00%	216.48%
	Hamilton	\$24,234	1.14%	2.25%	2.93%	157.03%
	Lewistown	\$32,997	1.17%	1.17%	1.17%	0.00%
	Havre	\$42,518	0.56%	0.91%	1.16%	104.78%
	Less than 1 MGD					
	Big Fork	\$44,398.00	1.11%	1.34%	1.48%	32.78%
	Big Sky	\$48,850.00	0.72%	1.22%	1.54%	115.07%
	Chinook	\$43,311.00	1.28%	1.84%	2.18%	70.55%
	Choteau	\$36,198.00	1.40%	1.74%	1.98%	41.27%
	Colstrip	\$77,679.00	0.63%	0.93%	1.15%	83.11%
	Columbia Falls	\$38,750.00	1.40%	1.40%	1.40%	0.00%
	Conrad	\$35,682.00	1.18%	1.49%	1.72%	45.92%
	East Helena	\$47,219.00	0.60%	0.96%	1.21%	100.66%
	Forsyth	\$35,556.00	1.20%	1.76%	2.12%	76.32%
	Laurel	\$42,175.00	1.14%	1.39%	1.59%	39.78%
	Libby	\$27,267.00	0.87%	1.34%	1.68%	93.39%
	Manhattan	\$50,729.00	0.69%	0.69%	0.69%	0.00%
	Lolo	\$46,442.00	0.72%	0.92%	1.01%	39.75%
	Poplar	\$19,464.00	1.18%	3.41%	4.48%	280.12%
	Stevensville	\$33,776.00	1.61%	1.96%	2.11%	31.33%
	Yellow fill = Greater than 2% MHI to reach to certain level of wastewater treatment					
	Orange fill = Greater than 100% increase in wastewater fee costs to reach to certain level of w					

astewater treatment

Community	Median Household Income (2010) - countywide MHI. Recommend updating for service area.	Population	Percent MHI needed to get to RO/Base Numeric Nutrient Criteria (including current fees)						
Billings	\$39,953.00	#REF!	#REF!	1	Population vs. %MHI--Big Seven Towns				
Missoula	\$41,661.00	#REF!	#REF!						
Great Falls	\$47,152.00	#REF!	#REF!						
Bozeman	\$37,335.00	#REF!	#REF!						
Butte	\$45,004.00	#REF!	#REF!						
Helena	\$34,319.00	#REF!	#REF!						
Kalispell	\$40,718.00	#REF!	#REF!						
Havre	\$35,689.00	#REF!	#REF!						
Miles City	\$37,554.00	#REF!	#REF!						
Livingston	\$25,161.00	#REF!	#REF!						
Lewistown	\$31,729.00	#REF!	#REF!						
Hamilton	\$43,577.00	#REF!	#REF!						
Columbia Falls	\$38,750.00	#REF!	1.40%	1					
Manhattan	\$50,729.00	#REF!	0.69%						
Lolo	\$46,442.00	#REF!	1.01%						
Stevensville	\$33,776.00	#REF!	2.11%						
Glendive	\$31,375.00	#REF!	#REF!						
Big Fork	\$44,833.00	#REF!	#REF!						
Deer Lodge	\$40,320.00	#REF!	#REF!						
Cut Bank	\$42,821.00	#REF!	#REF!						
Redlodge	\$50,123.00	#REF!	#REF!						
Philipsburg	\$44,398.00	#REF!	#REF!						
Circle	\$62,614.00	#REF!	#REF!	0					
Highwood	\$29,000.00	#REF!	#REF!						
				0.00%	0.50%				

Yellow fill = Greater than 2% MHI to reach to certain level of wastewater treatment

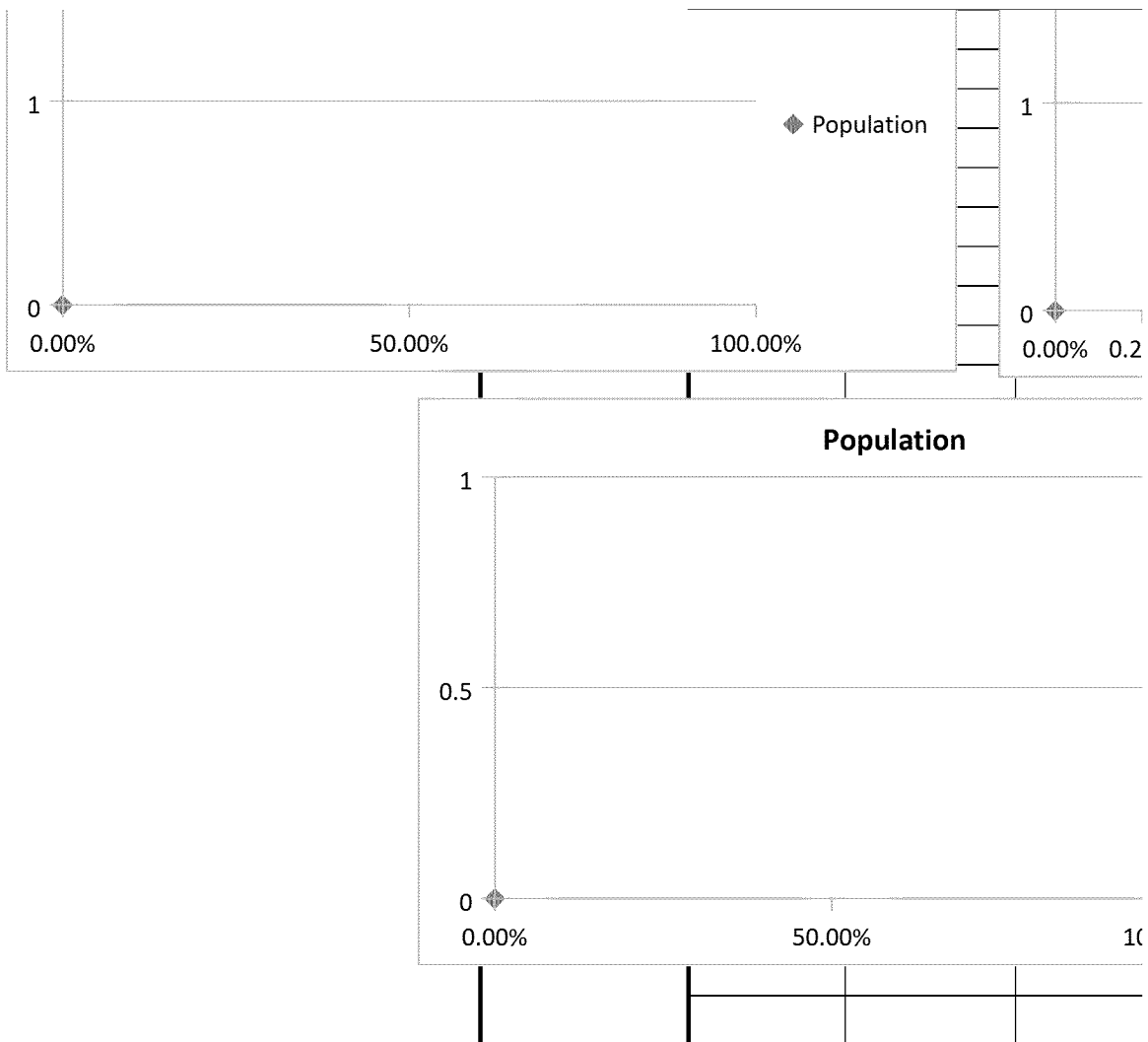
Orange fill = Greater than 100% increase in wastewater fee costs to reach to certain level of waste

Blue Fill = Town already meets the standard so no new costs or treatment needed

Population vs. %MHI--Big Seven Towns

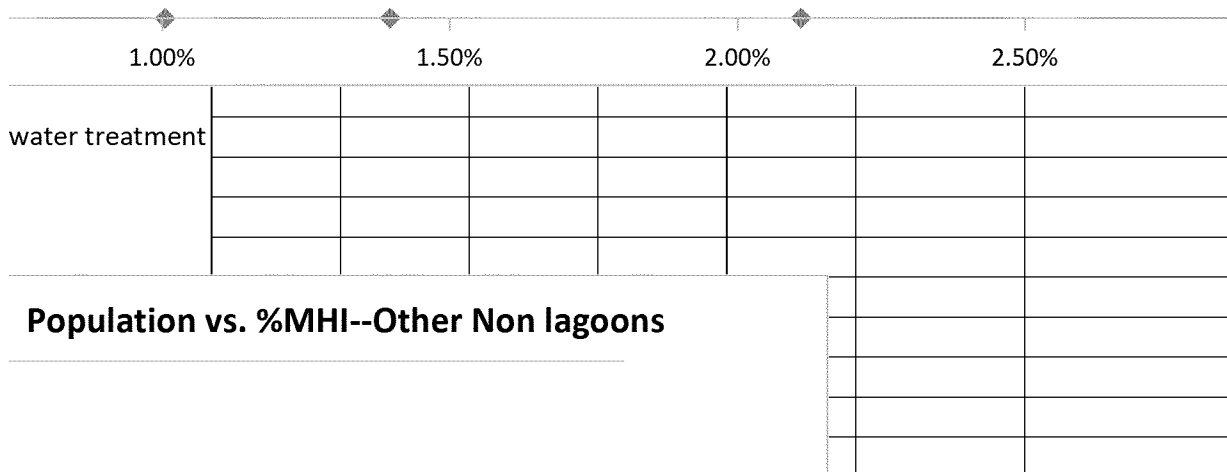
1

1



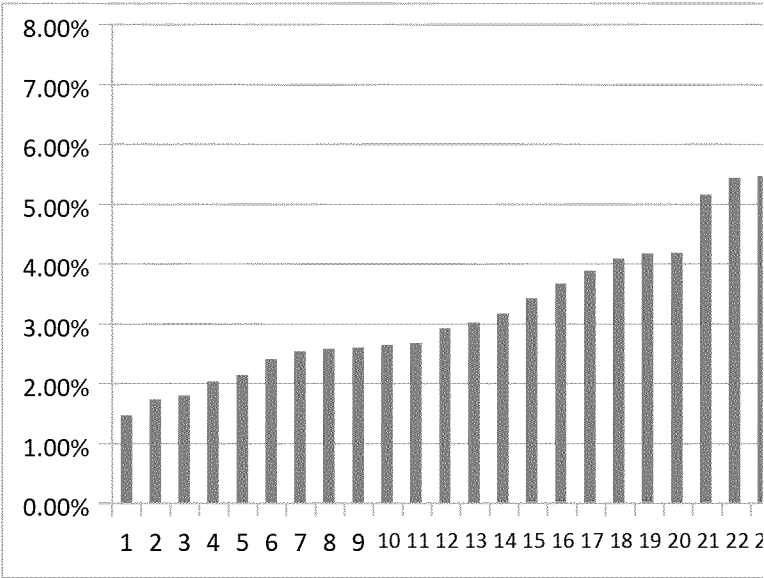
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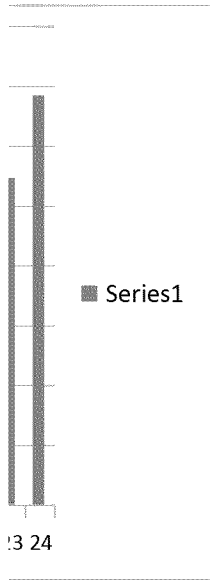
Population vs Percent MHI Needed to Reach Base Criteria



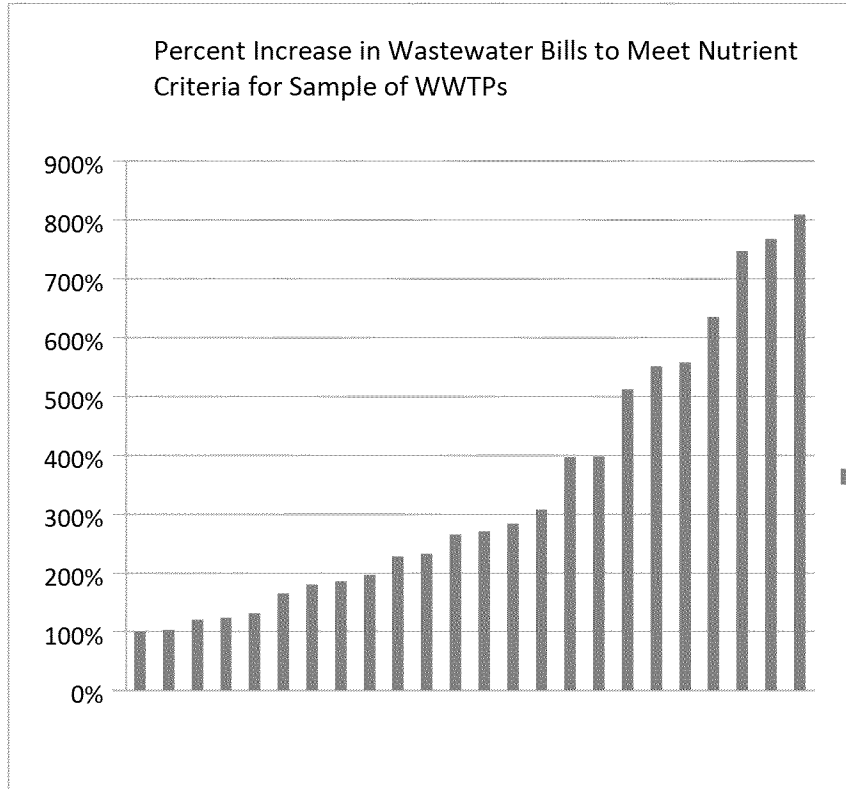
1.47%
1.74%
1.81%
2.04%
2.15%
2.41%
2.54%
2.58%
2.60%
2.65%
2.68%
2.92%
3.02%
3.17%
3.43%
3.67%
3.89%
4.09%
4.18%
4.19%
5.16%
5.44%
5.47%
6.85%

Total MHI% to meet nutrient criteria





100%
 103%
 120%
 123%
 131%
 165%
 180%
 186%
 196%
 228%
 232%
 264%
 270%
 283%
 307%
 396%
 398%
 511%
 551%
 557%
 635%
 747%
 767%
 808%





Community	Current Treatment Technology	Would the criteria apply? Or is there dilution capability?	Design Flow (MGD)	Actual Flow (MGD)	Community Population (Census 2010)	Number of Households (American Community Survey 2005-2009)
Big 7 Communities						
Kalispell	BNR (modified Johannesburg); 3.1 to 5.4 MGD; avg. .12 mg/l TP; 10 mg/l TN.	Yes. EOP; Ashley Creek	5.4	3.10	19,927	7,705
Bozeman	some BNR now; 5-stage Barrdenpho; new plant will be BNR (1 mg/l TP; 3 mg/l TN starting in 2011); current 5.8 MGD; increasing to 13.9 mgd	Yes. Also Gallatin TMDL in the works.	13.8	5.80	37,280	14,614
Helena	BNR; 3 mg/l TP; 10 mg/l TN; design capacity of 5.4; current discharge ~3.0 MGD	Yes. WLA set in TMDL based on numeric criteria.	5.4	3.00	28,190	12,337
Butte	Current technology is activated sludge (TN of 18.5 mg/l; TP of 2.11 mg/l); under Order to Construct to membrane BNR; current design is 8.5 MGD; talking about lowering to 6.1 MGD. Sewer Fee based on DEQ estimates. Included in current fee is \$27 million upgrade in new capital costs and \$1.125 million in O&M costs which would bring them to 5 TN and 0.1 TP	Yes. EOP.	8.5	4.00	33,525	14,041
Billings	2ndary treatment; Design flow of 26 MGD (avg.) and 40 MGD max.	Yes. Discharge into the Yellowstone River.	26	26	104,170	41,841
Missoula	advanced secondary treatment facility with biological nutrient removal and ultraviolet disinfection; meets Clark Fork criteria w/ mixing zone. 8.2 mg/l TN; 0.16 -0.4 mg/l TP; get a mixing zone, meeting criteria currently. BNR. Design flow = 12 MGD ; actual flow = 9 MGD. (designed for 10 and 1). (HDR)	Yes. With mixing zone. Currently meeting criteria after mixing zone.	12	9	66,788	27,553

Great Falls	conventional 2ndary activated sludge (max 21-MGD; avg. 10 MGD)	Yes. Missouri River	26	26	58,505	23,998
Other Large Communities > 1 MGD						
Livingston	discharges into the Yellowstone; permit renewed in 2010; mechanical plant w/ 2 primary clarifiers, 3 rotating biological contactors, UV, installing co-composting. DMR shows 11 mg/l TN average (20 mg/l for May) and 2 mg/l TP (3 mg/l for May).	Yes. Discharge into the Yellowstone River.	5	2	7,044	3,188
Miles City	2ndary treatment plus oxidation ditch. 2011 permit. Algae plant study to remove nutrients. Extended aeration system w/2 oxidation ditches w/rotating brush aerators; 2 clarifiers and chlorine basin. TN avg of 23.5 mg/l; TP avg. 3.6 mg/l.	Yes. Discharge into the Yellowstone River.	3.7	2	8,410	3,518
Hamilton	BNR facility. t w/ extended aeration system. Oxidation ditch w/ rotating brush aerators. 3 clarifiers. Upgraded in 2010. TN avg. 5.5 mg/l; TP avg. 5 mg/l.	Yes	1.98	0.68	4,348	2,092
Lewistown	BNR plant. Focus on TP removal. 0.8 mg/l TP; 3-4 mg/l TN.	Yes	2.5	1.5	5,901	2,727
Havre	Discharges into the Milk River. Permit renewed in 2011. Activated sludge facility with effluent chlorination. 2006-2010 data showed avg. TP of 3.4 (TN not required). 2011 DMR showed TN of 19.4 mg/l; Tp of 1.3 mg/l.	Yes	1.8	1.38	9,310	3,709
Non-Lagoon Facilities with < 1MGD						
Columbia Falls	Newer plant. Designed to achieve 8 mg/l TN	Yes	0.766	0.37	4,688	1,621

Manhattan	Discharges into Diva Ditch. Permit renewed in 2010. Denitrification with fixed film suspended growth system, clarifiers and aerobic sludge digestion, UV. DMR data from winter quarter shows 11 mg/l TN and 1 mg/l TP. 2008-2010 showed avg. TN of 14 mg/l TN and 4 mg/l TP.	Yes	0.6	0.4	1,520	523
Lolo	No steps towards nutrient removal. For Lolo, TN is generally less than 30 mg/l and TP less than 7. Generally heaving loadings for Lolo. Sewer rates--Lolo \$30.25-ish/mo - (RSID) based on property values	Yes	0.34	0.38	3,892	1,060
Stevensville	Stevensville is generally a little better with TN generally below 20 and TP less than 4.	Yes	0.3	0.29	1,809	795
Lagoons						
Philipsburg	lagoon - ref: Gary Swanson, consulting engineer- 15TN, 2TP	Yes.	0.2	0.2	820	399
Cut Bank	Lagoon.	Yes	0.643	0.643	2,869	1,290
Deer Lodge	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork	Yes	3.3	1.06	3,111	1,522
Glendive	domestic WW lagoon; 3 cell facultative; current O&M costs are <\$; 8-10 capital costs for new plant. O&M increase of ~\$300,000. new avg. 1.15 MGD; PER completed to upgrade to mechanical SBR or BNR plant.	Yes	1.3	0.6	4935	1883

Median Household Income (2010) - American Community Survey.	Current average household sewer bill per year (2008 / 2011)	Current average sewer fee as % of MHI	Notes	Capital cost (million dollars) to meet the numeric nutrient criteria (WERF)	Annual Capital cost to meet the numeric nutrient criteria (L4 WERF)	Annual Operations costs to meet the numeric nutrient criteria L4WERF	Annual Capital and Operations cost (\$)
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Big 7 Communities

\$39,953.00	\$361.68	0.91%	Sewer rates obtained from City in 2011. Plant ~WERF Level 2. \$30.14/month Based on a base rate of \$15.00 with a usage rate of \$4.19/1000 gal of water used	49.14	\$3,941,028	\$1,228,530	\$5,169,558
\$41,661.00	\$372.00	0.89%	Sewer rates obtained from City in 2011. Plant ~WERF Level 2. Really Level 3 for TN and 1 for TP	125.58	\$10,071,516	\$2,298,540	\$12,370,056
\$47,152.00	\$277.80	0.59%	Sewer rates obtained from City in 2011. Plant ~ WERF Level 1.	67.50	\$5,413,500	\$1,298,400	\$6,711,900
\$37,335.00	\$360.00	0.96%	Sewer Fee based on DEQ estimates. While current monthly fee is \$13.50, the \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP (WERF 3) would raise rates to \$30 per month	62.90	\$5,044,580	\$1,161,800	\$6,206,380
\$45,004.00	\$218.28	0.49%	The numbers for Billings and Great Falls (treatment levels, treatment costs etc.) were obtained from HDR.	312.50	\$25,062,500	\$11,252,800	\$36,315,300
\$34,319.00	\$152.14	0.44%	Sewer rates obtained from city. 2011 values.	88.80	\$7,121,760	\$2,614,050	\$9,735,810

\$40,718.00	\$187.20	0.46%	At WERF 1. The numbers for Billings and Great Falls (population, treatment levels, etc.) were obtained from HDR.	312.50	\$25,062,500	\$11,252,800	\$36,315,300
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Other Large Communities > 1 MGD

\$35,689.00	\$600.00	1.68%	Assume WERF Tier 1	62.50	\$5,012,500	\$865,600	\$5,878,100
\$37,554.00	\$236.10	0.63%	Assume WERF Tier 1	46.25	\$3,709,250	\$865,600	\$4,574,850
\$25,161.00	\$276.00	1.10%	Assume WERF 2 (since TN gets to WERF 3 and TP WERF 1)	24.75	\$1,984,950	\$301,984	\$2,286,934
\$31,729.00	\$387.60	1.22%	Assume WERF 3 based on current treatment levels	18.50	\$1,483,700	\$423,675	\$1,907,375
\$43,577	\$240.00	0.55%	Assumed WERF Level 1 and 5,000 gallons usage. Rate is \$9.15 flat plus \$2.15 per 1,000 gallons	\$22.50	\$1,804,500	\$597,264	\$2,401,764

Non-Lagoon Facilities with < 1MGD

\$38,750	\$532.20	1.37%	Upgrade to RO	\$5.67	\$454,606	\$580,900	\$1,035,506
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\$50,729	\$362.40	0.71%	Assumed WERF Level 2. Correct? Paul.	\$5.46	\$437,892	\$63,408	\$501,300
\$46,442	\$363.00	0.78%	Level 1.	\$4.25	\$340,850	\$164,464	\$505,314
\$33,776	\$535.08	1.58%		\$3.75	\$300,750	\$125,512	\$426,262

Lagoons

\$31,375.00	\$200.00	0.64%	Assume WERF 1	\$4.36	\$ 349,672.00	94,810.00	\$444,482.00
\$44,833	\$138.48	0.31%	4000 gallons. Base rate \$9.48 at 3000 gallons plus \$2.06 for next 1,000 gallons	\$14.02	\$ 1,124,195.48	246,140.40	\$1,370,335.88
\$40,320	\$409.56	1.02%	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork	\$71.94	\$1,261,145.00	\$502,493.00	\$1,763,638.00
\$42,821	\$213.96	0.50%		\$28.34	\$2,272,868.00	\$284,430.00	\$2,557,298.00

\$50,123	305.28	0.61%	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$26.16	\$2,098,032.00	\$308,132.50	\$2,406,164.50
\$44,398	580.36	1.31%		\$10.90	\$874,180.00	\$142,215.00	\$1,016,395.00
\$62,614	600.00	0.96%		\$0.57	\$45,457.36	\$7,110.75	\$52,568.11
\$29,000	259.56	0.90%		\$3.49	\$279,737.60	\$30,813.25	\$310,550.85

e.

Annual Additional Cost per Household (increase in sewer rate)	Predicted average household sewer fee to meet criteria	Expected % MHI to Meet Base Numeric Nutrient Criteria (plus current wastewater fees)	Percent increase in Wastewater bill		
\$671	\$1,033	2.58	186%		
\$846	\$1,218	2.92	228%		
\$544	\$822	1.74	196%		
\$442	\$802	2.15	123%		
\$868	\$1,086	2.41	398%		
\$353	\$505	1.47	232%		

	\$1,513	\$1,700	4.18	808%		
	\$1,844	\$2,444	6.85	307%		
	\$1,300	\$1,537	4.09	551%		
	\$1,093	\$1,369	5.44	396%		
	\$699	\$1,087	3.43	180%		
	\$648	\$888	2.04	270%		
					265-6719 - City Office	
	\$639	\$1,171	3.02	120%		

\$959	\$1,321	2.60	264%		
\$477	\$840	1.81	131%		
\$536	\$1,071	3.17	100%		

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\$1,113.99	\$1,314	4.19	557%
\$1,062.28	\$1,201	2.68	767%
\$1,158.76	\$1,568	3.89	283%
\$1,358.10	\$1,572	3.67	635%

\$2,280.72	\$2,586	5.16	747%		
\$595.08	\$1,175	2.65	103%		
\$991.85	\$1,592	2.54	165%		
\$1,327.14	\$1,587	5.47	511%		

WERF

Level	Description	Capital Cost (\$/gpd)	Operations (\$1/ MG/day Treated)
Level 1	No N and P removal	9.3	250
Level 2	1 mg/l TP; 8 mg/l TN	12.7	350
Level 3	0.1-0.3 mg/l TP; 4-8 mg/l TN	14.4	640
Level 4	<0.1 mg/l TP; 3 mg/l TN	15.3	880
Level 5	<0.01 mg/l TP; 1 mg/l TN	21.8	1370

Costs to Meet Criteria	Capital Cost(\$million/MGD)	Design Flow	Facility Upgrade Capital Costs (\$million)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)
Kalispell	9.1	5.4	\$49.14	\$3.94
Bozeman	9.1	13.8	\$125.58	\$10.07
Helena	12.5	5.4	\$67.50	\$5.41
Butte	7.4	8.5	\$62.90	\$5.04
Billings	12.5	25	\$312.50	\$25.06
Missoula	7.4	12	\$88.80	7.12176
Great Falls	12.5	25	\$312.50	25.0625
Livingston	12.5	5	\$62.50	\$5.01
Miles City	12.5	3.7	\$46.25	\$3.71
Hamilton	12.5	1.98	\$24.75	1.98495
Lewistown	7.4	2.5	\$18.50	1.4837
Havre	12.5	1.8	\$22.50	1.8045
Columbia Falls	7.4	0.766	\$5.67	0.45461
Manhattan	9.1	0.6	\$5.46	0.43789
Lolo	12.5	0.34	\$4.25	0.34085
Stephensville	12.5	0.3	\$3.75	0.30075
Philipsburg	21.8	0.2	\$4.36	\$0.35
Cut Bank	21.8	0.643	\$14.02	\$1.12
Deer Lodge	21.8	3.3	\$71.94	\$5.77
Glendive	21.8	1.3	\$28.34	2.27287
Red Lodge	21.8	1.2	\$26.16	2.09803
Big Fork	21.8	0.5	\$10.90	0.87418
Highwood	21.8	0.026	\$0.57	0.04546
Circle	21.8	0.16	\$3.49	0.27974

Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)	Operations (\$1/ MG/day Treated)	Operations Costs (\$/ year/ 1 MGD)	Actual Flow	Facility Upgrade Operations Costs (annual) based on Facility MGD	Membrane Replacement Cost (\$24,000 /yr/1 MGD)*Actual Flow
\$3,941,028.00	1020	372,300.00	3.10	1,154,130.00	74,400.00
\$10,071,516.00	1020	372,300.00	5.80	2,159,340.00	139,200.00
\$5,413,500.00	1120	408,800.00	3.00	1,226,400.00	72,000.00
\$5,044,580.00	730	266,450.00	4.00	1,065,800.00	96,000.00
\$25,062,500.00	1120	408,800.00	26.00	10,628,800.00	624,000.00
\$7,121,760.00	730	266,450.00	9.00	2,398,050.00	216,000.00
\$25,062,500.00	1120	408,800.00	26	10,628,800.00	624,000.00
\$5,012,500.00	1120	408,800.00	2.00	817,600.00	48,000.00
\$3,709,250.00	1120	408,800.00	2.00	817,600.00	48,000.00
\$1,984,950.00	1120	408,800.00	0.68	277,984.00	24,000.00
\$1,483,700.00	730	266,450.00	1.50	399,675.00	24,000.00
\$1,804,500.00	1120	408,800.00	1.38	564,144.00	33,120.00
\$454,605.68	730	266,450.00	2.00	532,900.00	48,000.00
\$437,892.00	1020	372,300.00	0.16	59,568.00	3,840.00
\$340,850.00	1120	408,800.00	0.38	155,344.00	9,120.00
\$300,750.00	1120	408,800.00	0.29	118,552.00	6,960.00
\$349,672.00	1370	450,050.00	0.20	90,010.00	4,800.00
\$1,124,195.48	1120	358,800.00	0.64	230,708.40	15,432.00
\$5,769,588.00	1370	450,050.00	1.06	477,053.00	25,440.00
\$2,272,868.00	1370	450,050.00	0.6	270,030.00	14,400.00
\$2,098,032.00	1370	450,050.00	0.65	292,532.50	15,600.00
\$874,180.00	1370	450,050.00	0.30	135,015.00	7,200.00
\$45,457.36	1370	450,050.00	0.015	6,750.75	360.00
\$279,737.60	1370	450,050.00	0.065	29,253.25	1,560.00

Total Operations costs including membrane replacement
1,228,530.00
2,298,540.00
1,298,400.00
1,161,800.00
11,252,800.00
2,614,050.00
\$11,252,800.00
\$865,600.00
\$865,600.00
301,984.00
423,675.00
\$597,264.00
\$580,900.00
\$63,408.00
\$164,464.00
\$125,512.00
\$94,810.00
\$246,140.40
\$502,493.00
\$284,430.00
\$308,132.50
\$142,215.00
\$7,110.75
\$30,813.25

Community	Current Treatment Technology
> 1 MGD	
Kalispell	Already below variance levels; achieving avg. 0.12 mg/l TP and 10 mg/l TN. Town expected to pay an addition \$6,967,150.56 annually to achieve 2% MHI.
Bozeman	Already below variance levels; should be close to achieving 1 mg/l TP and 3 -5 mg/l TN starting in 2011/2-12. Town expected to pay an additional \$8,319,750.2 annually to achieve 2% MHI.
Helena	After optimization study, should be achieving variance levels. Currently at 3 mg/l TP and 10 mg/l TN. Town expected to pay an additional \$9,633,963.3 annually to achieve 2%MHI.
Butte	Under Order to Construct to membrane BNR Will already meet variance levels after upgrade. The \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP. Upgrade would result in 1.5% MHI. Additional costs needed?
Missoula	Already meets Clark Fork criteria w/ mixing zone. Achieving 8.2 mg/l TN; 0.16 -0.4 mg/l TP. Would the town be expected to pay more (~\$18 million annually) towards 2% MHI or not since they are achieving the criteria?
Great Falls	Conventional 2ndary activated sludge (max 21-MGD; avg. 10 MGD). Based on Billings case study, likely long-term variance limits of Level 4 for WERF (0-.1 mg/l TP; 3 mg/l TN)
Billings	2ndary treatment; Design flow of 26 MGD (avg.) and 40 MGD max. Based on Billings case study, likely long-term variance limits of Level 4 for WERF (0-.1 mg/l TP; 3 mg/l TN)

Livingston	Based on existing high costs, likely that meeting 1 mg/l and 10 TN would be the feasible limits. MHI of 3.05 percent to achieve WERF level 3.
Miles City	2011 permit; calculated variance limits to <0.1 mg/l TP; 3 mg/l TN
Hamilton	BNR facility. t w/ extended aeration system. Oxidation ditch w/ rotating brush aerators. 3 clarifiers. Upgraded in 2010.
Lewistown	Already below variance levels;BNR plant. Lready below proposed interim effluent limits (0.8 mg/l TP; 3-4 mg/l TN).
Facilities with < 1MGD	
Manhattan	Discharges into Diva Ditch. Permit renewed in 2010. Denitrification with fixed film suspended growth system, clarifiers and aerobic sludge digestion, UV. DMR data from winter quarter shows 11 mg/l TN and 1 mg/l TP. 2008-2010 showed avg. TN of 14 mg/l TN and 4 mg/l TP.
Columbia Falls	Columbia Falls already meets variance level standards. Actual cost of \$3,927,688
Havre	Discharges into the Milk River. Permit renewed in 2011. Activated sludge facility with effluent chlorination. 2006-2010 data showed avg. TP of 3.4 (TN not required). 2011 DMR showed TN of 19.4 mg/l; Tp of 1.3 mg/l.
Lagoons	
Philipsburg	lagoon to simple mechanical system - ref: Gary Swanson, consulting engineer- 15TN, 2TP; Do we have actual costs for the upgrade?
Cut Bank	

Deer Lodge	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork
Glendive	Upgrade from a lagoon to mechanical plant - BNR or otherwise would result in > 2%MHI
Redlodge	Upgrade from a lagoon to mechanical plant - BNR or otherwise would result in >1.5% MHI

2% MHI information
draft numbers pending input

Flow Category	Community Population	Number of Households (Population / 2.5) based on 2000 Census	Median Household Income (2010) - countywide MHI. Recommend updating for service area.	Current average household sewer bill per year (2008 / 2011)
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> 1 MGD (1 mg/l TP; 10 mg/l TN)	27,544	10,012	\$45,594.00	\$216.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	37,280	14,614	\$47,065.00	\$372.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	28,190	12,337	\$52,317.00	\$265.44
> 1 MGD (1 mg/l TP; 10 mg/l TN)	33,525	14,041	\$40,055.00	\$360.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	108,623	28,290	\$40,130.00	\$152.14
> 1 MGD (1 mg/l TP; 10 mg/l TN)	82,178	23,998	\$40,434.00	\$187.20
> 1 MGD (1 mg/l TP; 10 mg/l TN)	104,170	41,841	\$45,004.00	\$218.28

> 1 MGD (1 mg/l TP; 10 mg/l TN)	7414	2965.6	35,689	\$600.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	9500	3800	37,554	\$236.10
> 1 MGD (1 mg/l TP; 10 mg/l TN)	5,200	2080	25,161	\$276.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	5,813	2,325	31,729	\$387.60

Facilities with

Yes	1,520	523	\$50,729	\$362.40
Yes- but Columbia Falls already meets it	4,688	1,621	\$38,750	\$532.20
	10,325.00	4130	\$38,082	240.00

Yes.	820	399	35806.00	200
Yes	2,869	1,290	\$29,000	\$138.48

Yes	3,111	1,522	\$40,320	\$409.56
	4621.00	1848.40	37000.00	213.96
	9,756.00	3,902	\$40,379	305.28

Current average sewer fee as % of MHI	Notes	Capital cost (million dollars) to meet the approximate variance levels (WERF)	Annual Capital cost to meet the approximate variance levels (L4 WERF)
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> 1 MGD

0.47%	Already meeting variance levels. Sewer rates obtained from City in 2011. Plant ~WERF Level 2.	\$0.00	\$0.00
0.79%	Already meeting variance levels. Sewer rates obtained from City in 2011. Plant ~WERF Level 2. Really Level 3 for TN and 1 for TP	\$0.00	\$0.00
0.51%	Sewer rates obtained from City in 2011. Plant ~ WERF Level 1.	\$18.36	\$1,472,472.00
0.90%	Will already meet variance levels after upgrade. While current monthly fee is \$13.50, the \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP would raise rates to \$30 per month	\$27.00	\$2,165,400.00
0.38%	Already meets variance levels	\$0.00	\$0.00
0.46%	and Great Falls (treatment levels, cost, etc.) were obtained from HDR.	\$85.00	\$6,817,000.00
0.49%	and Great Falls (treatment levels, cost, etc.) were obtained from HDR.	\$85.00	\$6,817,000.00

1.68%		17.00	1,363,400.00
0.63%		22.20	1,780,440.00
1.10%		5.00	793,980.00
1.22%		1.00	200,500.00

Facilities with < 1MGD

0.71%	Mainly designed to remove ammonia and some TN, but now have NO3 limit. May be able to meet with operational changes. TP of 2 mg/l may require more capital & O&M expenses. Ref: planning document, SRF loan application	\$7.56	\$606,312.00
1.37%	Upgrade to an existing Chemical P-removal plant - actual effluent concentrations are 4 TN and 0.05TP-- already included in current fee	\$0.00	\$0.00
0.63%	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$26.40	\$2,117,280.00

Lagoons

0.56%	lagoon to simple mechanical system - ref: Gary Swanson, consulting engineer- 15TN, 2TP	\$0.68	\$54,536.00
0.48%	4000 gallons. Base rate \$9.48 at 3000 gallons plus \$2.06 for next 1,000 gallons	\$21.80	\$1,018,540.00

1.02%		\$15.25	\$1,261,145.00
0.58%		\$10.00	\$802,000.00
	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$10.00	\$802,000.00

Annual Operations costs to meet the approximate variance levels L4WERF	Annual Capital and Operations cost (\$)	Annual Additional Cost per Household (increase in sewer rate)	Predicted average household sewer fee to meet criteria	Expected % MHI to Meet Variance Numbers (plus current wastewater fees)
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0.00	\$0.00	\$0.00	\$216	0.47
0.00	\$0.00	\$0.00	\$372	0.79
109,500.00	\$1,581,972.00	\$128.23	\$394	0.75
1,125,000.00	\$3,290,400.00	\$234.34	\$594	1.48
\$0.0	\$0.00	\$0.00	\$152	0.38
\$949,000.0	\$7,766,000.00	\$323.61	\$511	1.26
\$949,000.0	\$7,766,000.00	\$185.61	\$404	0.90

\$73,000.00	\$1,436,400.00	\$484.35	\$1,084	3.04
\$459,900.00	\$2,240,340.00	\$589.56	\$826	2.20
\$238,000.00	\$1,031,980.00	\$496.14	\$772	3.07
\$150,000.00	\$350,500.00	\$150.74	\$538	1.70

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	100,000.00	\$706,312.00	\$1,350.50	\$1,713	3.38	
	0.00	\$0.00	\$0.00	\$532	1.37	
	643860	\$2,761,140.00	\$668.56	\$909	2.39	

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	7,300.00	\$61,836.00	\$154.98	\$355	0.99	
	7,300.00	\$1,025,840.00	\$795.22	\$934	3.22	

602,000.00	\$1,863,145.00	\$1,224.14	\$1,634	4.05
300,000.00	\$1,102,000.00	\$596.19	\$810	2.19
300,000.00	\$1,102,000.00	\$282.39	\$588	1.46

	Percent increase in Wastewater bill	2% MHI	Total additional annual amount town would spend total to get to 2% MHI	
	0%	\$911.88	\$6,967,150.56	\$6,967,150.56
	0%	\$941.30	\$8,319,750.20	\$8,319,750.20
	48%	\$1,046.34	\$9,633,963.30	\$9,633,963.30
	65%	\$801.10	\$6,193,485.10	\$6,193,485.10
	0%	\$802.60	\$18,401,513.40	\$18,401,513.40
	173%	\$808.68	\$14,914,277.04	\$14,914,277.04
	85%	\$900.08	\$28,527,193.80	\$28,527,193.80

	81%		
	373%		
		\$1,014.58	\$341,090.14
	0%		
		\$775.00	\$393,578.80
	279%		
	77%		
		\$716.12	\$205,931.88
	574%		
		\$580.00	\$569,560.80

299%		
	\$806.40	\$603,990.48

WERF

Level	Description	Capital Cost (\$/gpd)	Operations (\$1,000/yr/10 MG Treated)
Level 1	No N and P removal	9.3	250
Level 2	1 mg/l TP; 8 mg/l TN	12.7	350
Level 3	0.1-0.3 mg/l TP; 4-8 mg/l TN	14.4	640
Level 4	<0.1 mg/l TP; 3 mg/l TN	15.3	880
Level 5	<0.01 mg/l TP; 1 mg/l TN	21.8	1370

Costs to Meet Criteria	Capital Cost (\$million/MGD)	Design Flow	Facility Upgrade Capital Costs (\$million)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)
Kalispell	0	5.4	\$0.00	\$0.00
Bozeman	0	13.8	\$0.00	\$0.00
Helena	3.4	5.4	\$18.36	\$1.47
Butte	Actual Costs	1	\$27.00	\$2.17
Missoula				
Great Falls	3.4	25	\$85.00	6.817
Billings	3.4	25	\$85.00	\$6.82
Livingston	3.4	5	\$17.00	1.3634
Miles City	6	3.7	\$22.20	1.78044
Hamilton	5	1.98	\$9.90	0.79398
Lewistown	1	2.5	\$2.50	0.2005
Manhattan				
Columbia Falls	Actual Costs	0.766	\$3,927,688.00	\$315,000.58
Havre	6	4.4	\$26.40	2.11728
Philipsburg	3.4	0.2	\$0.68	\$0.05
Cut Bank				
Deer Lodge				
Glendive	10		\$10.00	0.802
Red Lodge				

Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)	Operations (\$1/ MG/day Treated)	Operations Costs (\$/ year/ 1 MGD)	Actual Flow	Facility Upgrade Operations Costs (\$/year/1 MGD) based on Facility MGD	Membrane Replacement Cost (\$24,000 /yr/1 MGD)*Actual Flow - not necessary b/c no RO
\$0.00	0	0.00	3.10	0.00	0.00
\$0.00	0	0.00	5.80	0.00	0.00
\$1,472,472.00	100	36,500.00	3.00	109,500.00	0.00
\$2,165,400.00	0	0.00	4.00	1,125,000.00	0.00
\$6,817,000.00	100	36,500.00	26	949,000.00	0.00
\$6,817,000.00	100	36,500.00	26.00	949,000.00	0.00
\$1,363,400.00	100	36,500.00	2.00	73,000.00	0.00
\$1,780,440.00	630	229,950.00	2	459,900.00	0.00
\$793,980.00		350,000	0.68	238,000.00	
\$200,500.00		100,000.00	1.5	150,000.00	

\$315,000.58	0	0.00	0.37	0.00	0.00
\$2,117,280.00	630	229,950.00	2.8	643,860.00	0.00
\$54,536.00	100	36,500.00	0.20	7,300.00	0.00

\$802,000.00		300,000		300,000	
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Total Operations costs including membrane replacement
0.00
0.00
109,500.00
1,125,000.00
\$949,000.00
949,000.00
\$73,000.00
\$459,900.00
238,000.00
150,000.00

\$0.00
\$643,860.00
7,300.00

300,000

	Community	Median Household Income (2010) - countywide MHI. Recommend updating for service area.	Population	Estimated Number of Households (Population / 2.5) based on 2000 Census	Current Average Annual Household Wastewater Bill	Design Flow (MGD)	Actual Flow (MGD)	Current wastewater MHI	Percent MHI needed to get to RO/Base Numeric Nutrient Criteria (including current fees)
	Kalispell	\$39,953.00	19,927	7,705	\$216.00	5.4	3.10	0.54%	2.58%
	Bozeman	\$41,661.00	37,280	14,614	\$372.00	13.8	5.80	0.89%	2.92%
	Helena	\$47,152.00	28,190	12,337	\$265.44	5.4	3.00	0.56%	1.74%
	Butte	\$37,335.00	33,525	14,041	\$360.00	8.5	4.00	0.96%	2.15%
	Billings	\$45,004.00	104,170	41,841	\$218.28	26	26	0.49%	2.41%
	Missoula	\$34,319.00	66,788	27,553	\$152.14	12	9	0.44%	1.47%
	Great Falls	\$40,718.00	58,505	23,998	\$187.20	26	26	0.46%	4.18%
	Livingston	\$35,689.00	7,044	3,188	\$600.00	5	2	1.68%	6.85%
	Miles City	\$37,554.00	8,410	3,518	\$236.10	3.7	2	0.63%	4.09%
	Hamilton	\$25,161.00	4,348	2,092	\$276.00	1.98	0.68	1.10%	5.44%
	Lewistown	\$31,729.00	5,901	2,727	\$387.60	2.5	1.5	1.22%	3.43%
	Havre	\$43,577.00	9,310	3,709	\$240.00	1.8	1	0.55%	2.04%
	Columbia Falls	\$38,750.00	4,688	1,621	\$532.20	0.766	0.37	1.37%	3.02%
	Manhattan	\$50,729.00	1,520	523	\$362.40	0.6	0.4	0.71%	2.60%
	Lolo	\$46,442.00	3,892	1,060	\$363.00	0.34	0.38	0.78%	1.81%
	Stevensville	\$33,776.00	1,809	795	\$535.08	0.3	0.29	1.58%	3.17%

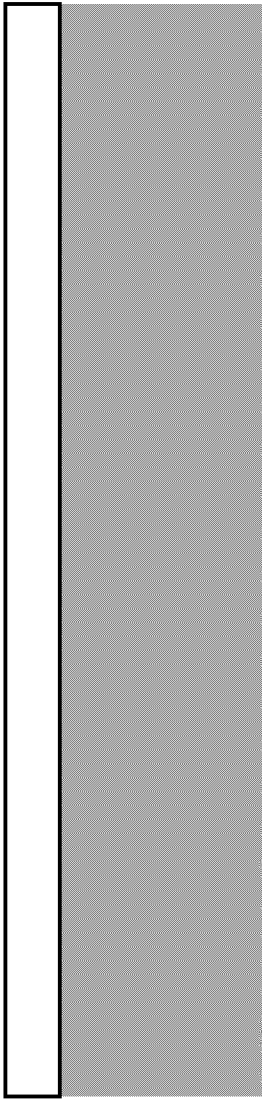
	Philipsburg	\$31,375.00	820	399	\$200.00	0.2		0.64%	4.19%
							0.2		
	Cut Bank	\$44,833.00	2,869	1,290	\$138.48	0.643	0.643	0.31%	2.68%
	Deer Lodge	\$40,320.00	3,111	1,522	\$409.56	3.3		1.02%	3.89%
	Glendive	\$42,821.00	4935	1,883	\$213.96	1.3	N/A	0.50%	3.67%

	Redlodge	\$50,123.00	2125	1,055	\$305.28	1.2	0.61%	5.16%
						0.65		

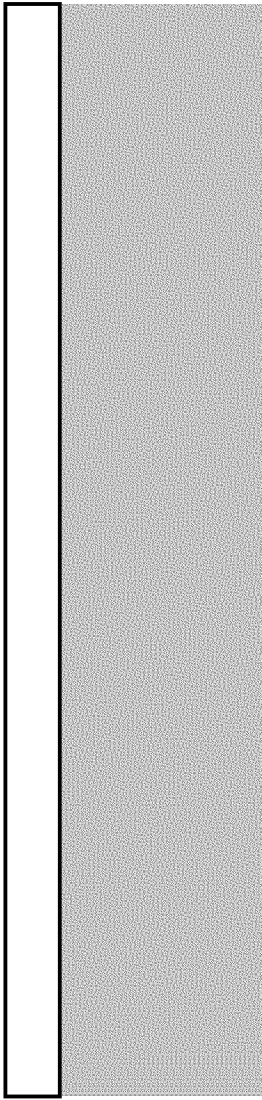
	Big Fork	\$44,398.00	4270	1,708	\$580.36	0.5		1.31%	2.65%

	Highwood	\$62,614.00	176	53	\$600.00	0.026		0.96%	2.54%
	Circle	\$29,000.00	615	234	\$259.56	0.16	0.015 0.065	0.90%	5.47%

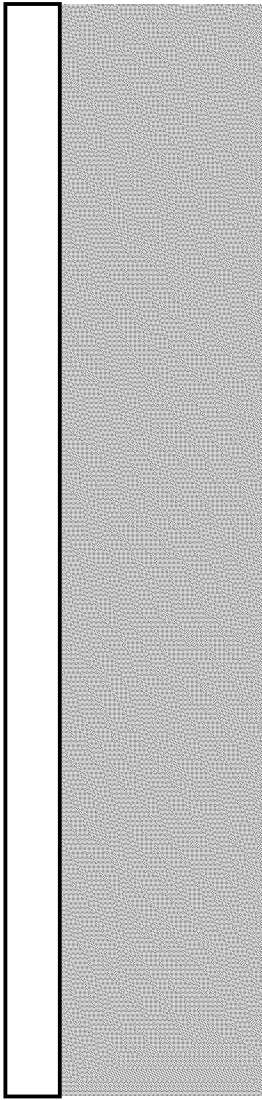
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Yellow fill = Greater than 2% MHI to reach to certain level of wastewater treatment



Orange fill = Greater than 100% increase in wastewater fee costs to reach to certain level of w



Blue Fill = Town already meets the standard so no new costs or treatment needed

Increase over current Wastewater Bill to Reach RO	Percent MHI needed to get to Variance in SB367 (including current fees)	Increase over current Wastewater Bill to Reach Variance	2% MHI per household	Total additional annual amount Town Would Need to Spend to get to 2% MHI
186%	0.47%	0%	\$799	\$4,492,477
228%	0.79%	0%	\$833	\$6,740,269
196%	0.75%	48%	\$943	\$8,359,551
123%	1.48%	65%	\$747	\$5,429,655
398%	0.90%	85%	\$900	\$28,527,194
232%	N/A	N/A	\$686	\$14,719,915
808%	1.26%	173%	\$814	\$15,050,586
307%			\$714	\$362,731
551%			\$751	\$1,811,700
396%			\$503	\$475,344
180%			\$635	\$673,514
270%			\$872	\$2,342,382
120%	1.37%	0%	\$775	\$393,579
264%	3.38%	373%	\$1,015	\$341,090
131%				
100%				

557%	0.99%	77%		
767%	3.22%	574%	\$628	\$170,573
283%	4.05%	299%	\$897	\$978,052
635%			\$806	\$603,990
			\$856	\$1,209,752

747%

\$1,002

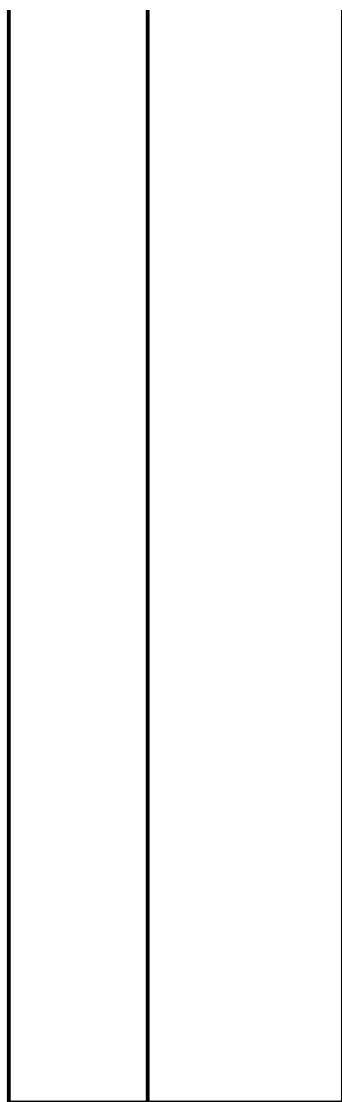
\$735,525

103%

\$888

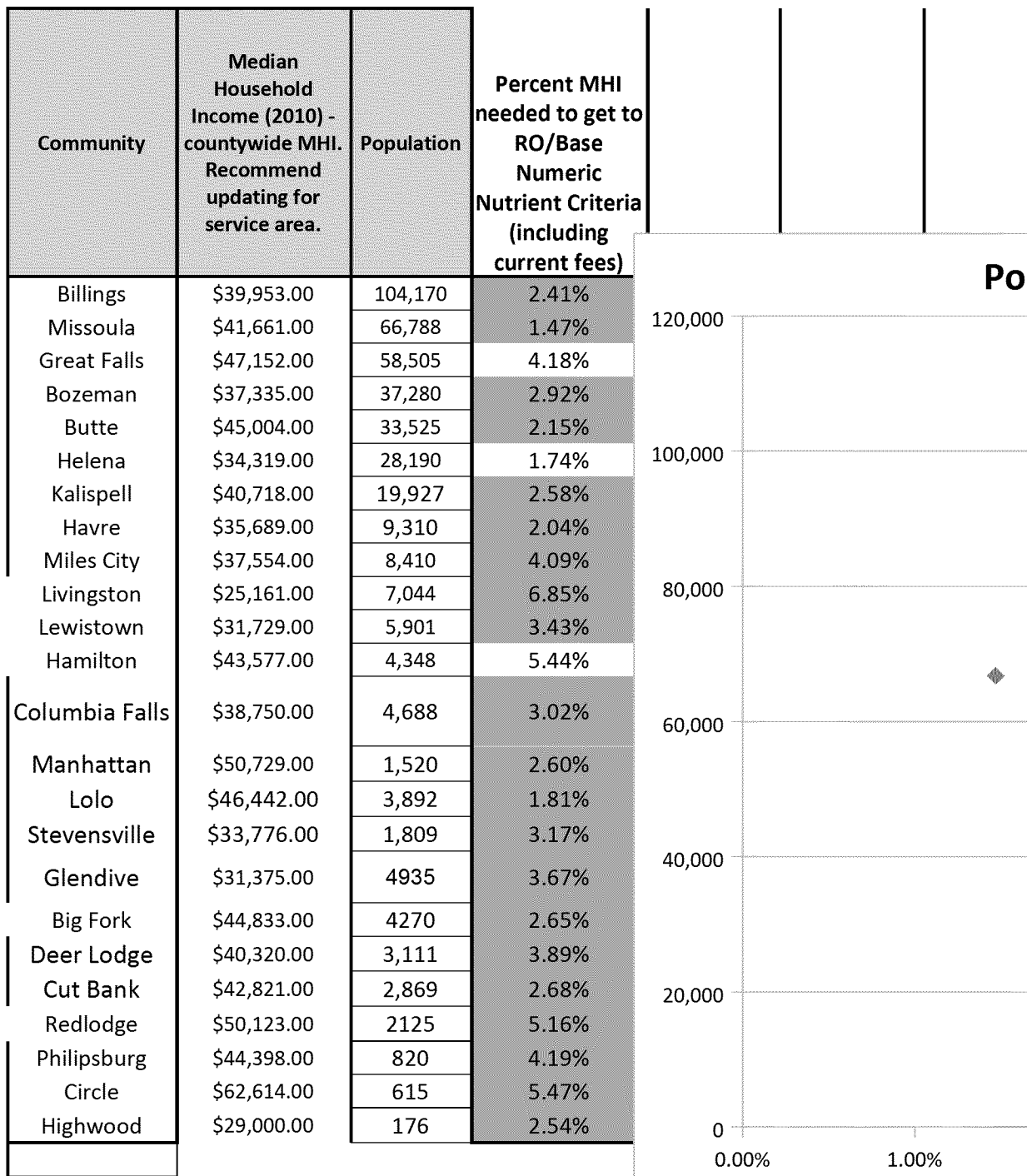
\$525,381

165%				
511%			\$1,252 \$580	\$34,571 \$74,983



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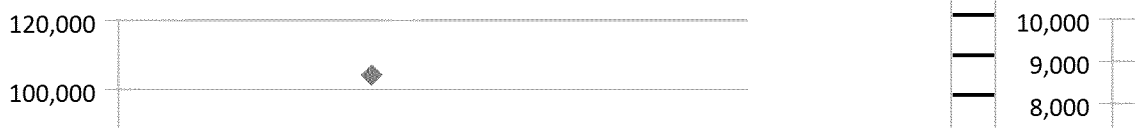


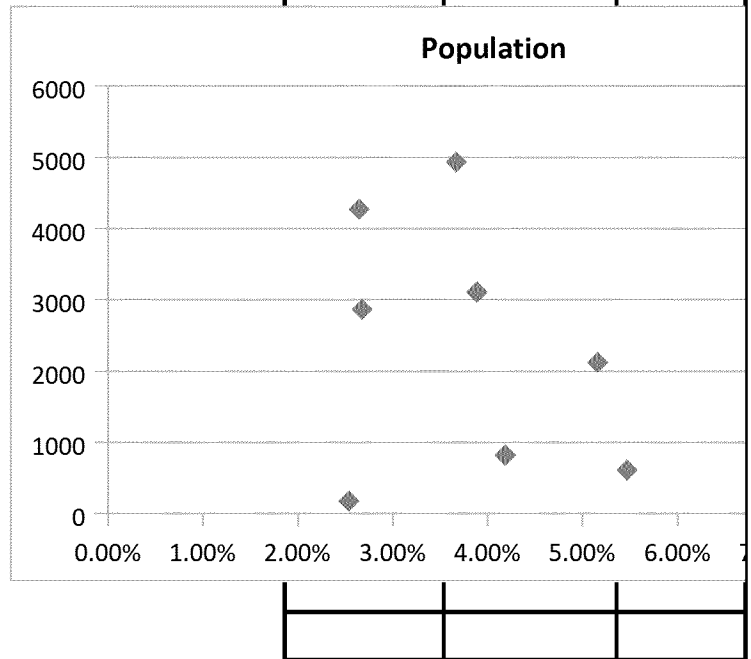
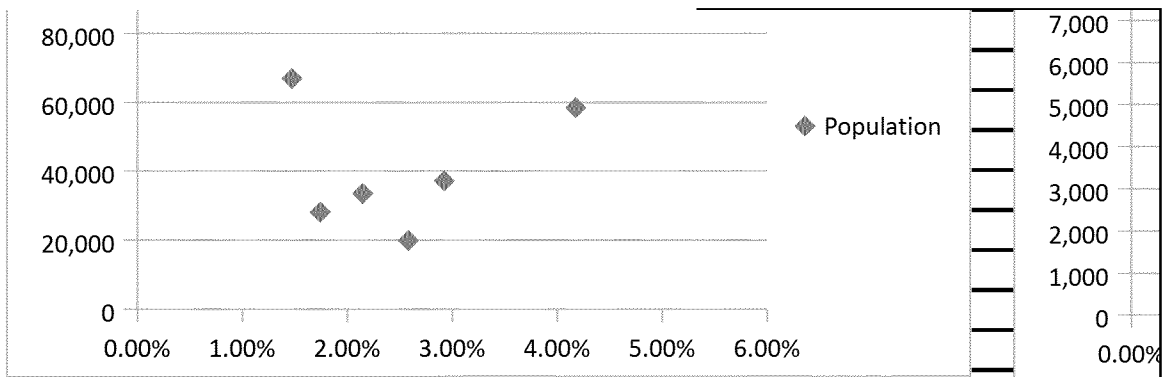
Yellow fill = Greater than 2% MHI to reach to certain level of wastewater treatment

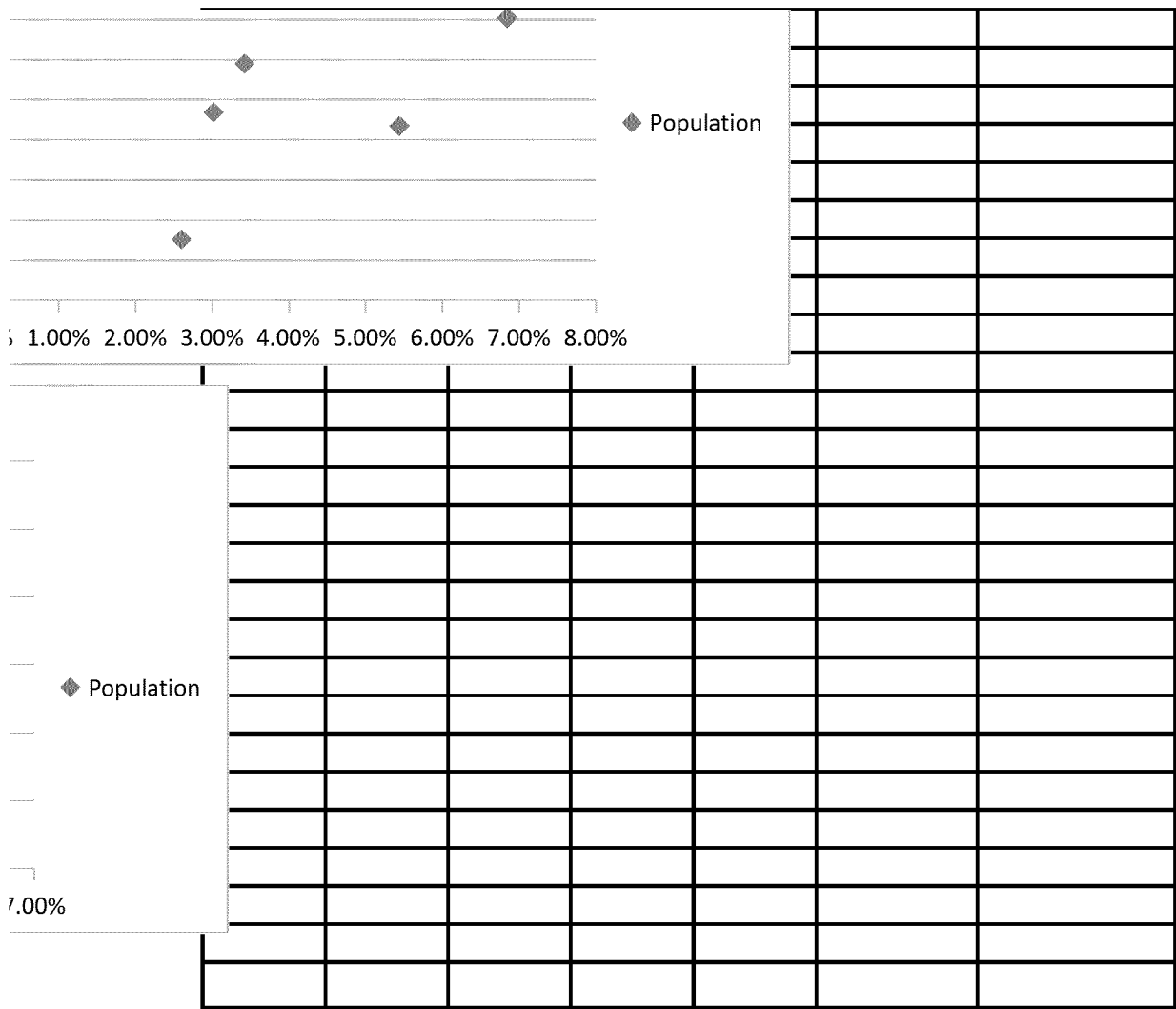
Orange fill = Greater than 100% increase in wastewater fee costs to reach to certain level of waste

Blue Fill = Town already meets the standard so no new costs or treatment needed

Population vs. %MHI--Big Seven Towns

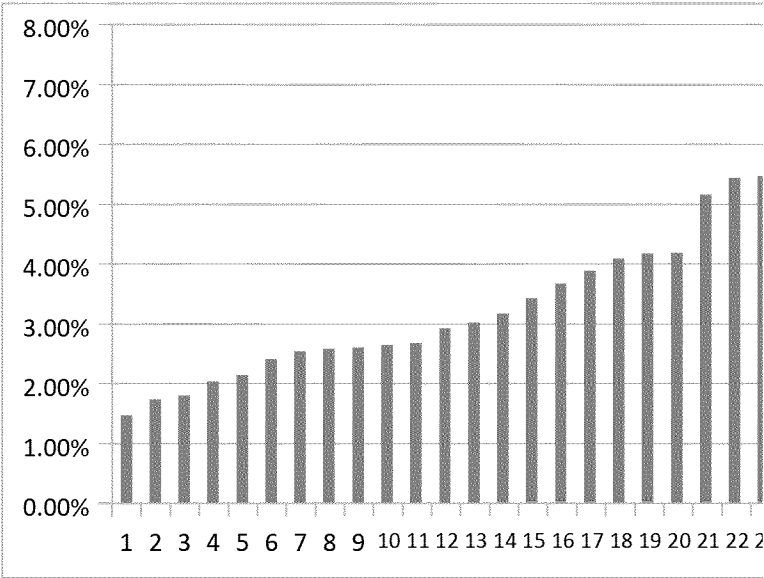


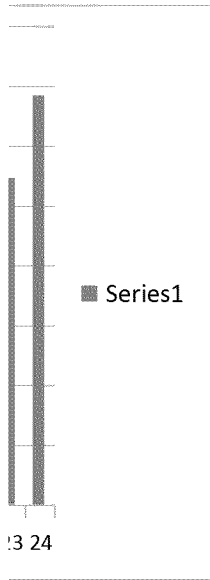




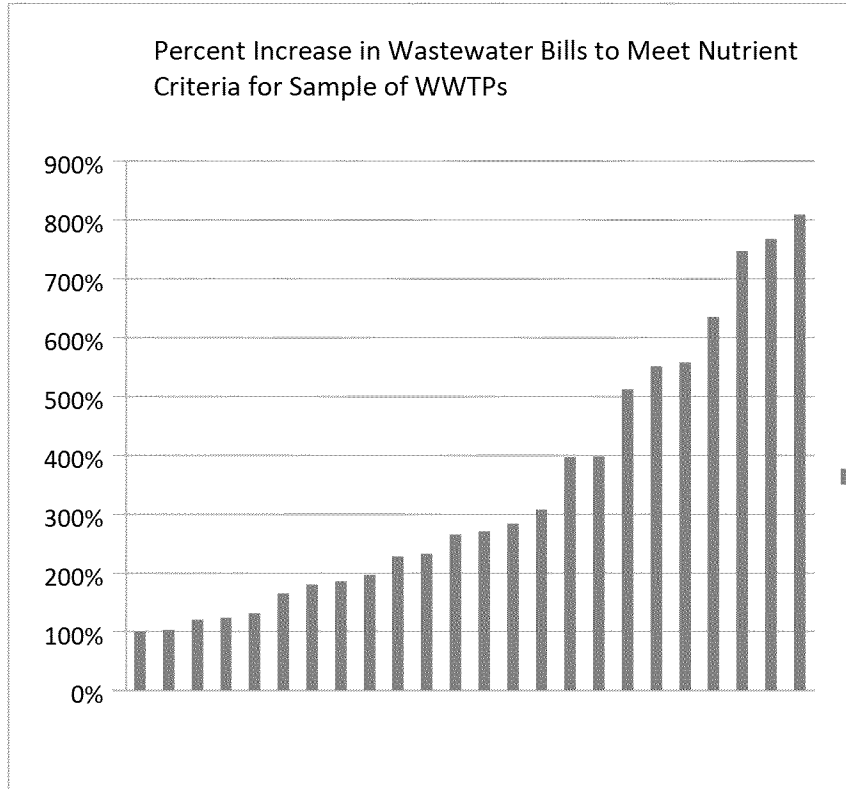
1.47%
1.74%
1.81%
2.04%
2.15%
2.41%
2.54%
2.58%
2.60%
2.65%
2.68%
2.92%
3.02%
3.17%
3.43%
3.67%
3.89%
4.09%
4.18%
4.19%
5.16%
5.44%
5.47%
6.85%

Total MHI% to meet nutrient criteria





100%
 103%
 120%
 123%
 131%
 165%
 180%
 186%
 196%
 228%
 232%
 264%
 270%
 283%
 307%
 396%
 398%
 511%
 551%
 557%
 635%
 747%
 767%
 808%





Community	Current Treatment Technology	Design Flow (MGD)	Actual Flow (MGD)	# of Households	Current WW annual bill	MHI 2010 (ACS 5 year estimate)
Big Fork	Assume WERF Level 1	0.69	0.3	1,708	\$580.36	\$52,147.00
Big Sky	Assume WERF Level 1	0.44	0.22	514	\$357.24	\$49,850.00
Chinook	Assume WERF Level 1	0.5	0.167	696	\$464.88	\$36,389.00
Choteau	Assume WERF Level 1	0.3	0.219	802	\$464.88	\$33,241.00
Colstrip	Assume WERF Level 1	0.6	0.48	812	\$464.88	\$74,095.00
Columbia Falls	Assume WERF Level 3. Newer plant with good control. Designed to achieve 8 mg/l TN	0.766	0.37	1,875	\$532.20	\$38,107.00
Conrad	Assume WERF Level 1	0.5	0.375	1,208	\$464.88	\$39,444.00
East Helena	Assume WERF Level 1	0.434	0.322	794	\$279.60	\$46,227.00
Forsyth	Assume WERF Level 1	0.54	0.248	722	\$464.88	\$38,661.00
Laurel	Assume WERF Level 1	0.88	0.853	2,603	\$464.88	\$40,906.00
Libby	Assume WERF Level 1	0.511	0.381	1,290	\$218.52	\$25,167.00
Manhattan	Assumed WERF Level 3. Denitrification with fixed film suspended growth system, clarifiers and aerobic sludge digestion, UV.	0.6	0.4	523	\$362.40	\$52,350.00
Lolo	WERF Level 1. No steps towards nutrient removal.	0.34	0.38	1,060	\$363.00	\$50,469.00
Poplar	Assume WERF Level 1	0.6	0.24	405	\$224.04	\$19,026.00
Stevensville	WERF Level 1. TN generally below 20 and TP less than 4.	0.3	0.29	795	\$535.08	\$33,293.00

NOTE: Operation costs include energy and chemical costs only and do not include labor and maintenance cost. A

NOTE: The numbers are intended to provide ROUGH ESTIMATES for discussion purposes and do not reflect the s

NOTE: Capital costs were assumed to cover a 20-year bond with 5% interest (used 0.0802 conversion factor)

NOTE: MHI is based on data from Montana CEIC based on 2010 estimates.



Indicates rough estimates; need to verify

Big Fork number of household based on population divided by 2.5

Capital cost (million dollars) to meet WERF 2	Annual Capital cost to meet WERF 2 (dollars)	Annual Operations costs to meet WERF 2 (dollars)	Annual Capital and Operations cost (\$)	Annual Additional Cost per Household (increase in sewer rate)	Predicted average household sewer fee to meet criteria	Expected % MHI to Meet Base Numeric Nutrient Criteria (plus current wastewater fees)	Percent increase in Wastewater bill
2.35	\$188,149	\$10,950	\$199,099	\$116.57	\$696.93	1.34%	20.09%
1.50	\$119,979	\$8,030	\$128,009	\$249.05	\$606.29	1.22%	69.71%
1.70	\$136,340	\$6,096	\$142,436	\$204.65	\$669.53	1.84%	44.02%
1.02	\$81,804	\$7,994	\$89,798	\$111.97	\$576.85	1.74%	24.09%
2.04	\$163,608	\$17,520	\$181,128	\$223.06	\$687.94	0.93%	47.98%
0.00	\$0	\$0	\$0	\$0.00	\$532.20	1.40%	0.00%
1.70	\$136,340	\$13,688	\$150,028	\$124.19	\$589.07	1.49%	26.72%
1.48	\$118,343	\$11,753	\$130,096	\$163.93	\$443.53	0.96%	58.63%
1.84	\$147,247	\$9,052	\$156,299	\$216.48	\$681.36	1.76%	46.57%
2.99	\$239,958	\$31,135	\$271,093	\$104.15	\$569.03	1.39%	22.40%
1.74	\$139,339	\$13,907	\$153,246	\$118.80	\$337.32	1.34%	54.36%
0.00	\$0	\$0	\$0	\$0.00	\$362.40	0.69%	0.00%
1.16	\$92,711	\$13,870	\$106,581	\$100.55	\$463.55	0.92%	27.70%
2.04	\$163,608	\$8,760	\$172,368	\$425.60	\$649.64	3.41%	189.97%
1.02	\$81,804	\$10,585	\$92,389	\$116.21	\$651.29	1.96%	21.72%

and maintenance costs. As such, these numbers are on the low side. and do not reflect specific conditions at each plant.

Community	Current Treatment Technology	Would the criteria apply? Or is there dilution capability?	Design Flow (MGD)	Actual Flow (MGD)	Community Population (Census 2010)	Number of Households (American Community Survey 2005-2009)
Big 7 Communities						
Kalispell	BNR (modified Johannesburg); 3.1 to 5.4 MGD; avg. .12 mg/l TP; 10 mg/l TN.	Yes. EOP; Ashley Creek	5.4	3.10	19,927	7,705
Bozeman	some BNR now; 5-stage Barrdenpho; new plant will be BNR (1 mg/l TP; 3 mg/l TN starting in 2011); current 5.8 MGD; increasing to 13.9 mgd	Yes. Also Gallatin TMDL in the works.	13.8	5.80	37,280	14,614
Helena	BNR; 3 mg/l TP; 10 mg/l TN; design capacity of 5.4; current discharge ~3.0 MGD	Yes. WLA set in TMDL based on numeric criteria.	5.4	3.00	28,190	12,337
Butte	Current technology is activated sludge (TN of 18.5 mg/l; TP of 2.11 mg/l); under Order to Construct to membrane BNR; current design is 8.5 MGD; talking about lowering to 6.1 MGD. Sewer Fee based on DEQ estimates. Included in current fee is \$27 million upgrade in new capital costs and \$1.125 million in O&M costs which would bring them to 5 TN and 0.1 TP	Yes. EOP.	8.5	4.00	33,525	14,041
Billings	2ndary treatment; Design flow of 26 MGD (avg.) and 40 MGD max.	Yes. Discharge into the Yellowstone River.	26	26	104,170	41,841
Missoula	advanced secondary treatment facility with biological nutrient removal and ultraviolet disinfection; meets Clark Fork criteria w/ mixing zone. 8.2 mg/l TN; 0.16 -0.4 mg/l TP; get a mixing zone, meeting criteria currently. BNR. Design flow = 12 MGD ; actual flow = 9 MGD. (designed for 10 and 1). (HDR)	Yes. With mixing zone. Currently meeting criteria after mixing zone.	12	9	66,788	27,553

Great Falls	conventional 2ndary activated sludge (max 21-MGD; avg. 10 MGD)	Yes. Missouri River	26	26	58,505	23,998
Other Large Communities > 1 MGD						
Livingston	discharges into the Yellowstone; permit renewed in 2010; mechanical plant w/ 2 primary clarifiers, 3 rotating biological contactors, UV, installing co-composting. DMR shows 11 mg/l TN average (20 mg/l for May) and 2 mg/l TP (3 mg/l for May).	Yes. Discharge into the Yellowstone River.	5	2	7,044	3,188
Miles City	2ndary treatment plus oxidation ditch. 2011 permit. Algae plant study to remove nutrients. Extended aeration system w/2 oxidation ditches w/rotating brush aerators; 2 clarifiers and chlorine basin. TN avg of 23.5 mg/l; TP avg. 3.6 mg/l.	Yes. Discharge into the Yellowstone River.	3.7	2	8,410	3,518
Hamilton	BNR facility. t w/ extended aeration system. Oxidation ditch w/ rotating brush aerators. 3 clarifiers. Upgraded in 2010. TN avg. 5.5 mg/l; TP avg. 5 mg/l.	Yes	1.98	0.68	4,348	2,092
Lewistown	BNR plant. Focus on TP removal. 0.8 mg/l TP; 3-4 mg/l TN.	Yes	2.5	1.5	5,901	2,727
Havre	Discharges into the Milk River. Permit renewed in 2011. Activated sludge facility with effluent chlorination. 2006-2010 data showed avg. TP of 3.4 (TN not required). 2011 DMR showed TN of 19.4 mg/l; Tp of 1.3 mg/l.	Yes	1.8	1.38	9,310	3,709
Non-Lagoon Facilities with < 1MGD						
Columbia Falls	Newer plant. Designed to achieve 8 mg/l TN	Yes	0.766	0.37	4,688	1,621

Manhattan	Discharges into Diva Ditch. Permit renewed in 2010. Denitrification with fixed film suspended growth system, clarifiers and aerobic sludge digestion, UV. DMR data from winter quarter shows 11 mg/l TN and 1 mg/l TP. 2008-2010 showed avg. TN of 14 mg/l TN and 4 mg/l TP.	Yes	0.6	0.4	1,520	523
Lolo	No steps towards nutrient removal. For Lolo, TN is generally less than 30 mg/l and TP less than 7. Generally heaving loadings for Lolo. Sewer rates--Lolo \$30.25-ish/mo - (RSID) based on property values	Yes	0.34	0.38	3,892	1,060
Stevensville	Stevensville is generally a little better with TN generally below 20 and TP less than 4.	Yes	0.3	0.29	1,809	795
Lagoons						
Philipsburg	lagoon - ref: Gary Swanson, consulting engineer- 15TN, 2TP	Yes.	0.2	0.2	820	399
Cut Bank	Lagoon.	Yes	0.643	0.643	2,869	1,290
Deer Lodge	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork	Yes	3.3	1.06	3,111	1,522
Glendive	domestic WW lagoon; 3 cell facultative; current O&M costs are <\$; 8-10 capital costs for new plant. O&M increase of ~\$300,000. new avg. 1.15 MGD; PER completed to upgrade to mechanical SBR or BNR plant.	Yes	1.3	0.6	4935	1883

Median Household Income (2010) - American Community Survey.	Current average household sewer bill per year (2008 / 2011)	Current average sewer fee as % of MHI	Notes	Capital cost (million dollars) to meet the numeric nutrient criteria (WERF)	Annual Capital cost to meet the numeric nutrient criteria (L4 WERF)	Annual Operations costs to meet the numeric nutrient criteria L4WERF	Annual Capital and Operations cost (\$)
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Big 7 Communities

\$39,953.00	\$361.68	0.91%	Sewer rates obtained from City in 2011. Plant ~WERF Level 2. \$30.14/month Based on a base rate of \$15.00 with a usage rate of \$4.19/1000 gal of water used	49.14	\$3,941,028	\$1,228,530	\$5,169,558
\$41,661.00	\$372.00	0.89%	Sewer rates obtained from City in 2011. Plant ~WERF Level 2. Really Level 3 for TN and 1 for TP	125.58	\$10,071,516	\$2,298,540	\$12,370,056
\$47,152.00	\$277.80	0.59%	Sewer rates obtained from City in 2011. Plant ~ WERF Level 1.	67.50	\$5,413,500	\$1,298,400	\$6,711,900
\$37,335.00	\$360.00	0.96%	Sewer Fee based on DEQ estimates. While current monthly fee is \$13.50, the \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP (WERF 3) would raise rates to \$30 per month	62.90	\$5,044,580	\$1,161,800	\$6,206,380
\$45,004.00	\$218.28	0.49%	The numbers for Billings and Great Falls (treatment levels, treatment costs etc.) were obtained from HDR.	312.50	\$25,062,500	\$11,252,800	\$36,315,300
\$34,319.00	\$152.14	0.44%	Sewer rates obtained from city. 2011 values.	88.80	\$7,121,760	\$2,614,050	\$9,735,810

\$40,718.00	\$187.20	0.46%	At WERF 1. The numbers for Billings and Great Falls (population, treatment levels, etc.) were obtained from HDR.	312.50	\$25,062,500	\$11,252,800	\$36,315,300
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Other Large Communities > 1 MGD

\$35,689.00	\$600.00	1.68%	Assume WERF Tier 1	62.50	\$5,012,500	\$865,600	\$5,878,100
\$37,554.00	\$236.10	0.63%	Assume WERF Tier 1	46.25	\$3,709,250	\$865,600	\$4,574,850
\$25,161.00	\$276.00	1.10%	Assume WERF 2 (since TN gets to WERF 3 and TP WERF 1)	24.75	\$1,984,950	\$301,984	\$2,286,934
\$31,729.00	\$387.60	1.22%	Assume WERF 3 based on current treatment levels	18.50	\$1,483,700	\$423,675	\$1,907,375
\$43,577	\$240.00	0.55%	Assumed WERF Level 1 and 5,000 gallons usage. Rate is \$9.15 flat plus \$2.15 per 1,000 gallons	\$22.50	\$1,804,500	\$597,264	\$2,401,764

Non-Lagoon Facilities with < 1MGD

\$38,750	\$532.20	1.37%	Upgrade to RO	\$5.67	\$454,606	\$580,900	\$1,035,506
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\$50,729	\$362.40	0.71%	Assumed WERF Level 2. Correct? Paul.	\$5.46	\$437,892	\$63,408	\$501,300
\$46,442	\$363.00	0.78%	Level 1.	\$4.25	\$340,850	\$164,464	\$505,314
\$33,776	\$535.08	1.58%		\$3.75	\$300,750	\$125,512	\$426,262

Lagoons

\$31,375.00	\$200.00	0.64%	Assume WERF 1	\$4.36	\$ 349,672.00	94,810.00	\$444,482.00
\$44,833	\$138.48	0.31%	4000 gallons. Base rate \$9.48 at 3000 gallons plus \$2.06 for next 1,000 gallons	\$14.02	\$ 1,124,195.48	246,140.40	\$1,370,335.88
\$40,320	\$409.56	1.02%	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork	\$71.94	\$1,261,145.00	\$502,493.00	\$1,763,638.00
\$42,821	\$213.96	0.50%		\$28.34	\$2,272,868.00	\$284,430.00	\$2,557,298.00

\$50,123	305.28	0.61%	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$26.16	\$2,098,032.00	\$308,132.50	\$2,406,164.50
\$44,398	580.36	1.31%		\$10.90	\$874,180.00	\$142,215.00	\$1,016,395.00
\$62,614	600.00	0.96%		\$0.57	\$45,457.36	\$7,110.75	\$52,568.11
\$29,000	259.56	0.90%		\$3.49	\$279,737.60	\$30,813.25	\$310,550.85

e.

Annual Additional Cost per Household (increase in sewer rate)	Predicted average household sewer fee to meet criteria	Expected % MHI to Meet Base Numeric Nutrient Criteria (plus current wastewater fees)	Percent increase in Wastewater bill		
\$671	\$1,033	2.58	186%		
\$846	\$1,218	2.92	228%		
\$544	\$822	1.74	196%		
\$442	\$802	2.15	123%		
\$868	\$1,086	2.41	398%		
\$353	\$505	1.47	232%		

	\$1,513	\$1,700	4.18	808%		
	\$1,844	\$2,444	6.85	307%		
	\$1,300	\$1,537	4.09	551%		
	\$1,093	\$1,369	5.44	396%		
	\$699	\$1,087	3.43	180%		
	\$648	\$888	2.04	270%		
					265-6719 - City Office	
	\$639	\$1,171	3.02	120%		

\$959	\$1,321	2.60	264%		
\$477	\$840	1.81	131%		
\$536	\$1,071	3.17	100%		
\$1,113.99	\$1,314	4.19	557%		
\$1,062.28	\$1,201	2.68	767%		
\$1,158.76	\$1,568	3.89	283%		
\$1,358.10	\$1,572	3.67	635%		

\$2,280.72	\$2,586	5.16	747%		
\$595.08	\$1,175	2.65	103%		
\$991.85	\$1,592	2.54	165%		
\$1,327.14	\$1,587	5.47	511%		

WERF

Level	Description	Capital Cost (\$/gpd)	Operations (\$1/ MG/day Treated)
Level 1	No N and P removal	9.3	250
Level 2	1 mg/l TP; 8 mg/l TN	12.7	350
Level 3	0.1-0.3 mg/l TP; 4-8 mg/l TN	14.4	640
Level 4	<0.1 mg/l TP; 3 mg/l TN	15.3	880
Level 5	<0.01 mg/l TP; 1 mg/l TN	21.8	1370

Costs to Meet Criteria	Capital Cost(\$million/MGD)	Design Flow	Facility Upgrade Capital Costs (\$million)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)
Kalispell	9.1	5.4	\$49.14	\$3.94
Bozeman	9.1	13.8	\$125.58	\$10.07
Helena	12.5	5.4	\$67.50	\$5.41
Butte	7.4	8.5	\$62.90	\$5.04
Billings	12.5	25	\$312.50	\$25.06
Missoula	7.4	12	\$88.80	7.12176
Great Falls	12.5	25	\$312.50	25.0625
Livingston	12.5	5	\$62.50	\$5.01
Miles City	12.5	3.7	\$46.25	\$3.71
Hamilton	12.5	1.98	\$24.75	1.98495
Lewistown	7.4	2.5	\$18.50	1.4837
Havre	12.5	1.8	\$22.50	1.8045
Columbia Falls	7.4	0.766	\$5.67	0.45461
Manhattan	9.1	0.6	\$5.46	0.43789
Lolo	12.5	0.34	\$4.25	0.34085
Stephensville	12.5	0.3	\$3.75	0.30075
Philipsburg	21.8	0.2	\$4.36	\$0.35
Cut Bank	21.8	0.643	\$14.02	\$1.12
Deer Lodge	21.8	3.3	\$71.94	\$5.77
Glendive	21.8	1.3	\$28.34	2.27287
Red Lodge	21.8	1.2	\$26.16	2.09803
Big Fork	21.8	0.5	\$10.90	0.87418
Highwood	21.8	0.026	\$0.57	0.04546
Circle	21.8	0.16	\$3.49	0.27974

Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)	Operations (\$1/ MG/day Treated)	Operations Costs (\$/ year/ 1 MGD)	Actual Flow	Facility Upgrade Operations Costs (annual) based on Facility MGD	Membrane Replacement Cost (\$24,000 /yr/1 MGD)* Actual Flow
\$3,941,028.00	1020	372,300.00	3.10	1,154,130.00	74,400.00
\$10,071,516.00	1020	372,300.00	5.80	2,159,340.00	139,200.00
\$5,413,500.00	1120	408,800.00	3.00	1,226,400.00	72,000.00
\$5,044,580.00	730	266,450.00	4.00	1,065,800.00	96,000.00
\$25,062,500.00	1120	408,800.00	26.00	10,628,800.00	624,000.00
\$7,121,760.00	730	266,450.00	9.00	2,398,050.00	216,000.00
\$25,062,500.00	1120	408,800.00	26	10,628,800.00	624,000.00
\$5,012,500.00	1120	408,800.00	2.00	817,600.00	48,000.00
\$3,709,250.00	1120	408,800.00	2.00	817,600.00	48,000.00
\$1,984,950.00	1120	408,800.00	0.68	277,984.00	24,000.00
\$1,483,700.00	730	266,450.00	1.50	399,675.00	24,000.00
\$1,804,500.00	1120	408,800.00	1.38	564,144.00	33,120.00
\$454,605.68	730	266,450.00	2.00	532,900.00	48,000.00
\$437,892.00	1020	372,300.00	0.16	59,568.00	3,840.00
\$340,850.00	1120	408,800.00	0.38	155,344.00	9,120.00
\$300,750.00	1120	408,800.00	0.29	118,552.00	6,960.00
\$349,672.00	1370	450,050.00	0.20	90,010.00	4,800.00
\$1,124,195.48	1120	358,800.00	0.64	230,708.40	15,432.00
\$5,769,588.00	1370	450,050.00	1.06	477,053.00	25,440.00
\$2,272,868.00	1370	450,050.00	0.6	270,030.00	14,400.00
\$2,098,032.00	1370	450,050.00	0.65	292,532.50	15,600.00
\$874,180.00	1370	450,050.00	0.30	135,015.00	7,200.00
\$45,457.36	1370	450,050.00	0.015	6,750.75	360.00
\$279,737.60	1370	450,050.00	0.065	29,253.25	1,560.00

Total Operations costs including membrane replacement
1,228,530.00
2,298,540.00
1,298,400.00
1,161,800.00
11,252,800.00
2,614,050.00
\$11,252,800.00
\$865,600.00
\$865,600.00
301,984.00
423,675.00
\$597,264.00
\$580,900.00
\$63,408.00
\$164,464.00
\$125,512.00
\$94,810.00
\$246,140.40
\$502,493.00
\$284,430.00
\$308,132.50
\$142,215.00
\$7,110.75
\$30,813.25

Community	Current Treatment Technology
> 1 MGD	
Kalispell	Already below variance levels; achieving avg. 0.12 mg/l TP and 10 mg/l TN. Town expected to pay an addition \$6,967,150.56 annually to achieve 2% MHI.
Bozeman	Already below variance levels; should be close to achieving 1 mg/l TP and 3 -5 mg/l TN starting in 2011/2-12. Town expected to pay an additional \$8,319,750.2 annually to achieve 2% MHI.
Helena	After optimization study, should be achieving variance levels. Currently at 3 mg/l TP and 10 mg/l TN. Town expected to pay an additional \$9,633,963.3 annually to achieve 2%MHI.
Butte	Under Order to Construct to membrane BNR Will already meet variance levels after upgrade. The \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP. Upgrade would result in 1.5% MHI. Additional costs needed?
Missoula	Already meets Clark Fork criteria w/ mixing zone. Achieving 8.2 mg/l TN; 0.16 -0.4 mg/l TP. Would the town be expected to pay more (~\$18 million annually) towards 2% MHI or not since they are achieving the criteria?
Great Falls	Conventional 2ndary activated sludge (max 21-MGD; avg. 10 MGD). Based on Billings case study, likely long-term variance limits of Level 4 for WERF (0-.1 mg/l TP; 3 mg/l TN)
Billings	2ndary treatment; Design flow of 26 MGD (avg.) and 40 MGD max. Based on Billings case study, likely long-term variance limits of Level 4 for WERF (0-.1 mg/l TP; 3 mg/l TN)

Livingston	Based on existing high costs, likely that meeting 1 mg/l and 10 TN would be the feasible limits. MHI of 3.05 percent to achieve WERF level 3.
Miles City	2011 permit; calculated variance limits to <0.1 mg/l TP; 3 mg/l TN
Hamilton	BNR facility. t w/ extended aeration system. Oxidation ditch w/ rotating brush aerators. 3 clarifiers. Upgraded in 2010.
Lewistown	Already below variance levels;BNR plant. Lready below proposed interim effluent limits (0.8 mg/l TP; 3-4 mg/l TN).
Facilities with < 1MGD	
Manhattan	Discharges into Diva Ditch. Permit renewed in 2010. Denitrification with fixed film suspended growth system, clarifiers and aerobic sludge digestion, UV. DMR data from winter quarter shows 11 mg/l TN and 1 mg/l TP. 2008-2010 showed avg. TN of 14 mg/l TN and 4 mg/l TP.
Columbia Falls	Columbia Falls already meets variance level standards. Actual cost of \$3,927,688
Havre	Discharges into the Milk River. Permit renewed in 2011. Activated sludge facility with effluent chlorination. 2006-2010 data showed avg. TP of 3.4 (TN not required). 2011 DMR showed TN of 19.4 mg/l; Tp of 1.3 mg/l.
Lagoons	
Philipsburg	lagoon to simple mechanical system - ref: Gary Swanson, consulting engineer- 15TN, 2TP; Do we have actual costs for the upgrade?
Cut Bank	

Deer Lodge	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork
Glendive	Upgrade from a lagoon to mechanical plant - BNR or otherwise would result in > 2%MHI
Redlodge	Upgrade from a lagoon to mechanical plant - BNR or otherwise would result in >1.5% MHI

2% MHI information
draft numbers pending input

Flow Category	Community Population	Number of Households (Population / 2.5) based on 2000 Census	Median Household Income (2010) - countywide MHI. Recommend updating for service area.	Current average household sewer bill per year (2008 / 2011)
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> 1 MGD (1 mg/l TP; 10 mg/l TN)	27,544	10,012	\$45,594.00	\$216.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	37,280	14,614	\$47,065.00	\$372.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	28,190	12,337	\$52,317.00	\$265.44
> 1 MGD (1 mg/l TP; 10 mg/l TN)	33,525	14,041	\$40,055.00	\$360.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	108,623	28,290	\$40,130.00	\$152.14
> 1 MGD (1 mg/l TP; 10 mg/l TN)	82,178	23,998	\$40,434.00	\$187.20
> 1 MGD (1 mg/l TP; 10 mg/l TN)	104,170	41,841	\$45,004.00	\$218.28

> 1 MGD (1 mg/l TP; 10 mg/l TN)	7414	2965.6	35,689	\$600.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	9500	3800	37,554	\$236.10
> 1 MGD (1 mg/l TP; 10 mg/l TN)	5,200	2080	25,161	\$276.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	5,813	2,325	31,729	\$387.60

Facilities with

Yes	1,520	523	\$50,729	\$362.40
Yes- but Columbia Falls already meets it	4,688	1,621	\$38,750	\$532.20
	10,325.00	4130	\$38,082	240.00

Yes.	820	399	35806.00	200
Yes	2,869	1,290	\$29,000	\$138.48

Yes	3,111	1,522	\$40,320	\$409.56
	4621.00	1848.40	37000.00	213.96
	9,756.00	3,902	\$40,379	305.28

Current average sewer fee as % of MHI	Notes	Capital cost (million dollars) to meet the approximate variance levels (WERF)	Annual Capital cost to meet the approximate variance levels (L4 WERF)
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> 1 MGD

0.47%	Already meeting variance levels. Sewer rates obtained from City in 2011. Plant ~WERF Level 2.	\$0.00	\$0.00
0.79%	Already meeting variance levels. Sewer rates obtained from City in 2011. Plant ~WERF Level 2. Really Level 3 for TN and 1 for TP	\$0.00	\$0.00
0.51%	Sewer rates obtained from City in 2011. Plant ~ WERF Level 1.	\$18.36	\$1,472,472.00
0.90%	Will already meet variance levels after upgrade. While current monthly fee is \$13.50, the \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP would raise rates to \$30 per month	\$27.00	\$2,165,400.00
0.38%	Already meets variance levels	\$0.00	\$0.00
0.46%	and Great Falls (treatment levels, cost, etc.) were obtained from HDR.	\$85.00	\$6,817,000.00
0.49%	and Great Falls (treatment levels, cost, etc.) were obtained from HDR.	\$85.00	\$6,817,000.00

1.68%		17.00	1,363,400.00
0.63%		22.20	1,780,440.00
1.10%		5.00	793,980.00
1.22%		1.00	200,500.00

Facilities with < 1MGD

0.71%	Mainly designed to remove ammonia and some TN, but now have NO3 limit. May be able to meet with operational changes. TP of 2 mg/l may require more capital & O&M expenses. Ref: planning document, SRF loan application	\$7.56	\$606,312.00
1.37%	Upgrade to an existing Chemical P-removal plant - actual effluent concentrations are 4 TN and 0.05TP-- already included in current fee	\$0.00	\$0.00
0.63%	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$26.40	\$2,117,280.00

Lagoons

0.56%	lagoon to simple mechanical system - ref: Gary Swanson, consulting engineer- 15TN, 2TP	\$0.68	\$54,536.00
0.48%	4000 gallons. Base rate \$9.48 at 3000 gallons plus \$2.06 for next 1,000 gallons	\$21.80	\$1,018,540.00

1.02%		\$15.25	\$1,261,145.00
0.58%		\$10.00	\$802,000.00
	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$10.00	\$802,000.00

Annual Operations costs to meet the approximate variance levels L4WERF	Annual Capital and Operations cost (\$)	Annual Additional Cost per Household (increase in sewer rate)	Predicted average household sewer fee to meet criteria	Expected % MHI to Meet Variance Numbers (plus current wastewater fees)
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0.00	\$0.00	\$0.00	\$216	0.47
0.00	\$0.00	\$0.00	\$372	0.79
109,500.00	\$1,581,972.00	\$128.23	\$394	0.75
1,125,000.00	\$3,290,400.00	\$234.34	\$594	1.48
\$0.0	\$0.00	\$0.00	\$152	0.38
\$949,000.0	\$7,766,000.00	\$323.61	\$511	1.26
\$949,000.0	\$7,766,000.00	\$185.61	\$404	0.90

\$73,000.00	\$1,436,400.00	\$484.35	\$1,084	3.04
\$459,900.00	\$2,240,340.00	\$589.56	\$826	2.20
\$238,000.00	\$1,031,980.00	\$496.14	\$772	3.07
\$150,000.00	\$350,500.00	\$150.74	\$538	1.70

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	100,000.00	\$706,312.00	\$1,350.50	\$1,713	3.38	
	0.00	\$0.00	\$0.00	\$532	1.37	
	643860	\$2,761,140.00	\$668.56	\$909	2.39	

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	7,300.00	\$61,836.00	\$154.98	\$355	0.99	
	7,300.00	\$1,025,840.00	\$795.22	\$934	3.22	

602,000.00	\$1,863,145.00	\$1,224.14	\$1,634	4.05
300,000.00	\$1,102,000.00	\$596.19	\$810	2.19
300,000.00	\$1,102,000.00	\$282.39	\$588	1.46

	Percent increase in Wastewater bill	2% MHI	Total additional annual amount town would spend total to get to 2% MHI	
	0%	\$911.88	\$6,967,150.56	\$6,967,150.56
	0%	\$941.30	\$8,319,750.20	\$8,319,750.20
	48%	\$1,046.34	\$9,633,963.30	\$9,633,963.30
	65%	\$801.10	\$6,193,485.10	\$6,193,485.10
	0%	\$802.60	\$18,401,513.40	\$18,401,513.40
	173%	\$808.68	\$14,914,277.04	\$14,914,277.04
	85%	\$900.08	\$28,527,193.80	\$28,527,193.80

81%		
373%		
	\$1,014.58	\$341,090.14
0%		
	\$775.00	\$393,578.80
279%		
77%		
	\$716.12	\$205,931.88
574%		
	\$580.00	\$569,560.80

299%		
	\$806.40	\$603,990.48

WERF

Level	Description	Capital Cost (\$/gpd)	Operations (\$1,000/yr/10 MG Treated)
Level 1	No N and P removal	9.3	250
Level 2	1 mg/l TP; 8 mg/l TN	12.7	350
Level 3	0.1-0.3 mg/l TP; 4-8 mg/l TN	14.4	640
Level 4	<0.1 mg/l TP; 3 mg/l TN	15.3	880
Level 5	<0.01 mg/l TP; 1 mg/l TN	21.8	1370

Costs to Meet Criteria	Capital Cost (\$million/MGD)	Design Flow	Facility Upgrade Capital Costs (\$million)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)
Kalispell	0	5.4	\$0.00	\$0.00
Bozeman	0	13.8	\$0.00	\$0.00
Helena	3.4	5.4	\$18.36	\$1.47
Butte	Actual Costs	1	\$27.00	\$2.17
Missoula				
Great Falls	3.4	25	\$85.00	6.817
Billings	3.4	25	\$85.00	\$6.82
Livingston	3.4	5	\$17.00	1.3634
Miles City	6	3.7	\$22.20	1.78044
Hamilton	5	1.98	\$9.90	0.79398
Lewistown	1	2.5	\$2.50	0.2005
Manhattan				
Columbia Falls	Actual Costs	0.766	\$3,927,688.00	\$315,000.58
Havre	6	4.4	\$26.40	2.11728
Philipsburg	3.4	0.2	\$0.68	\$0.05
Cut Bank				
Deer Lodge				
Glendive	10		\$10.00	0.802
Red Lodge				

Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)	Operations (\$1/ MG/day Treated)	Operations Costs (\$/ year/ 1 MGD)	Actual Flow	Facility Upgrade Operations Costs (\$/year/1 MGD) based on Facility MGD	Membrane Replacement Cost (\$24,000 /yr/1 MGD)*Actual Flow - not necessary b/c no RO
\$0.00	0	0.00	3.10	0.00	0.00
\$0.00	0	0.00	5.80	0.00	0.00
\$1,472,472.00	100	36,500.00	3.00	109,500.00	0.00
\$2,165,400.00	0	0.00	4.00	1,125,000.00	0.00
\$6,817,000.00	100	36,500.00	26	949,000.00	0.00
\$6,817,000.00	100	36,500.00	26.00	949,000.00	0.00
\$1,363,400.00	100	36,500.00	2.00	73,000.00	0.00
\$1,780,440.00	630	229,950.00	2	459,900.00	0.00
\$793,980.00		350,000	0.68	238,000.00	
\$200,500.00		100,000.00	1.5	150,000.00	

\$315,000.58	0	0.00	0.37	0.00	0.00
\$2,117,280.00	630	229,950.00	2.8	643,860.00	0.00
\$54,536.00	100	36,500.00	0.20	7,300.00	0.00

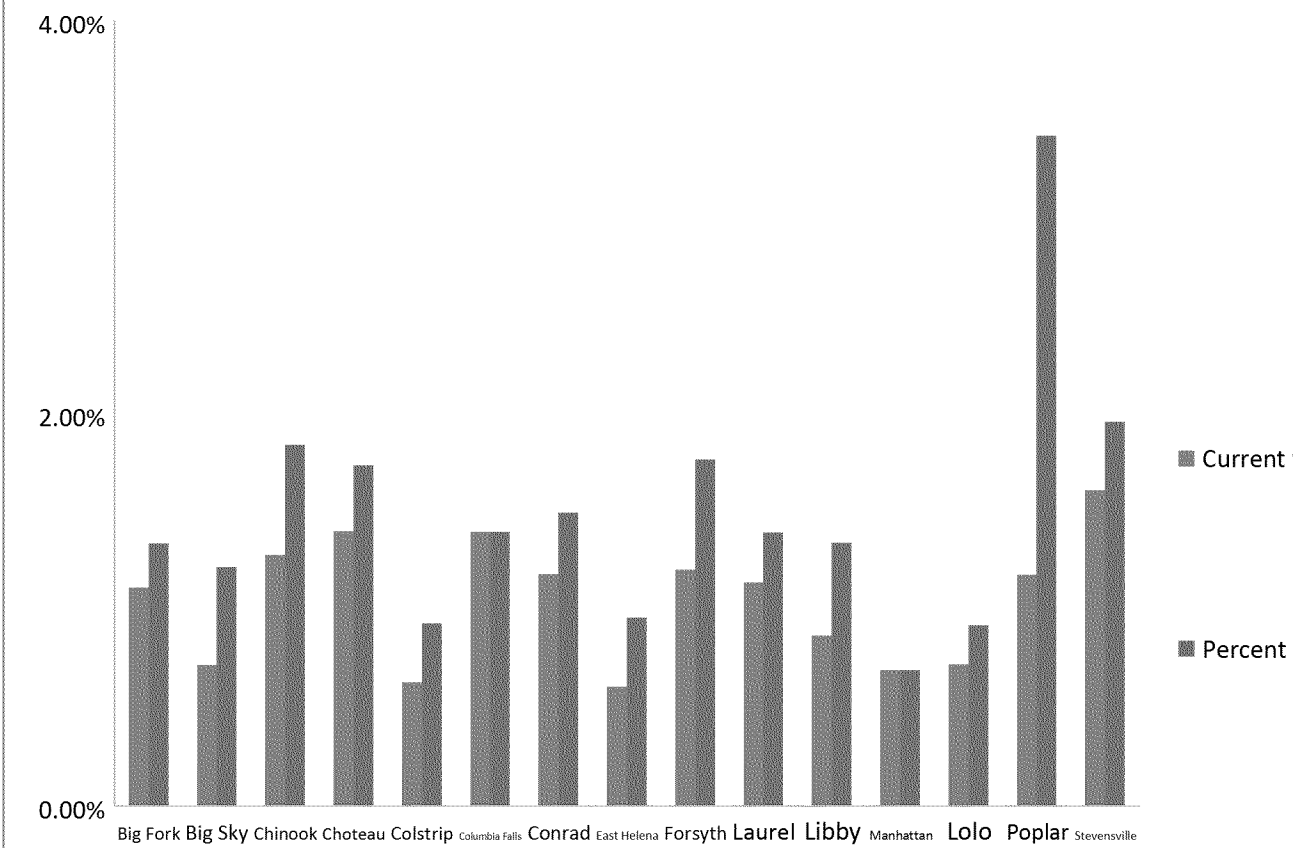
\$802,000.00		300,000		300,000	
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Total Operations costs including membrane replacement
0.00
0.00
109,500.00
1,125,000.00
\$949,000.00
949,000.00
\$73,000.00
\$459,900.00
238,000.00
150,000.00

\$0.00
\$643,860.00
7,300.00

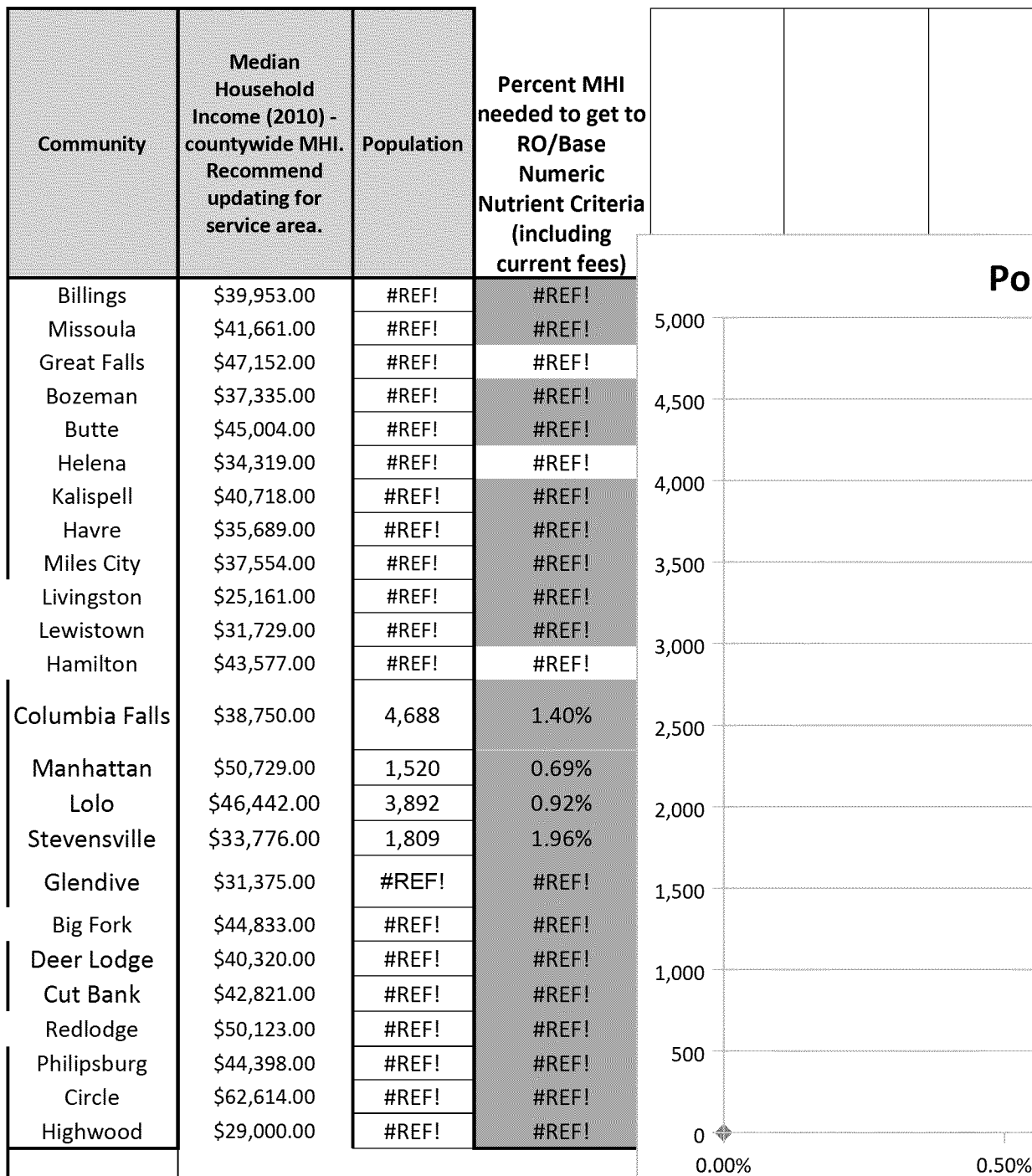
300,000

Percent MHI



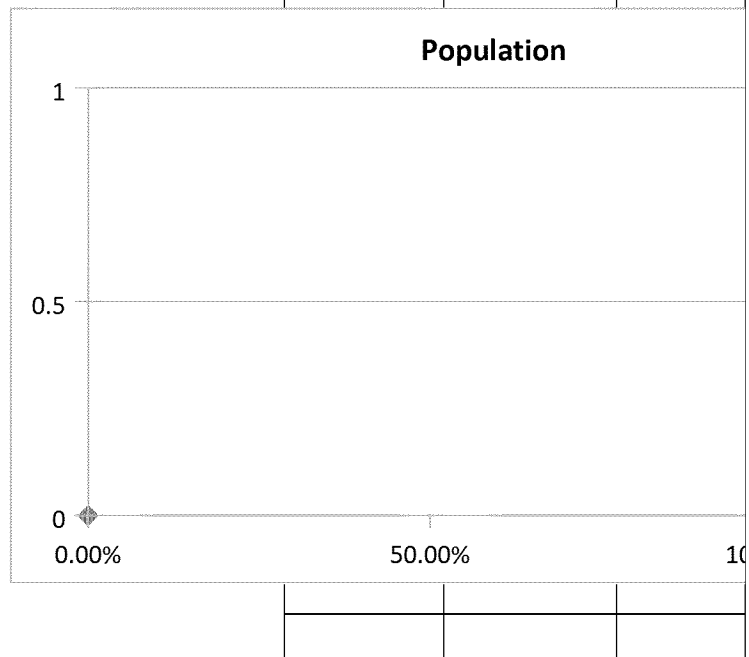
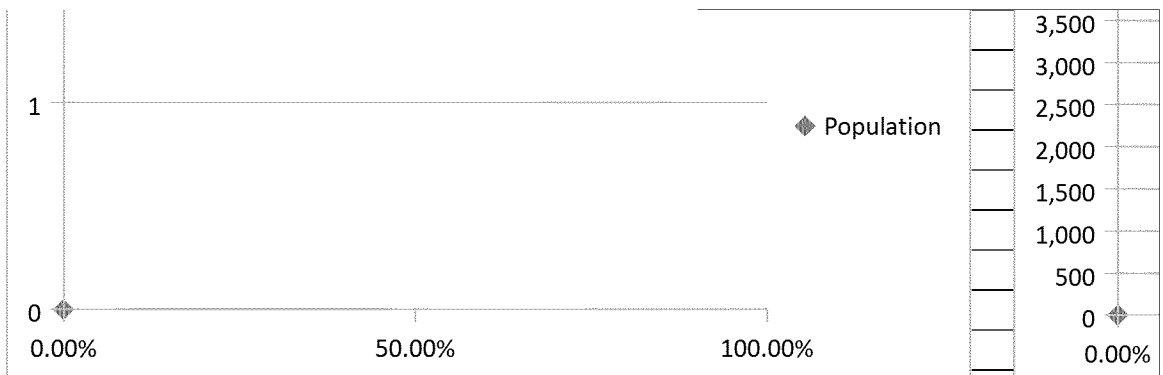
Level of w

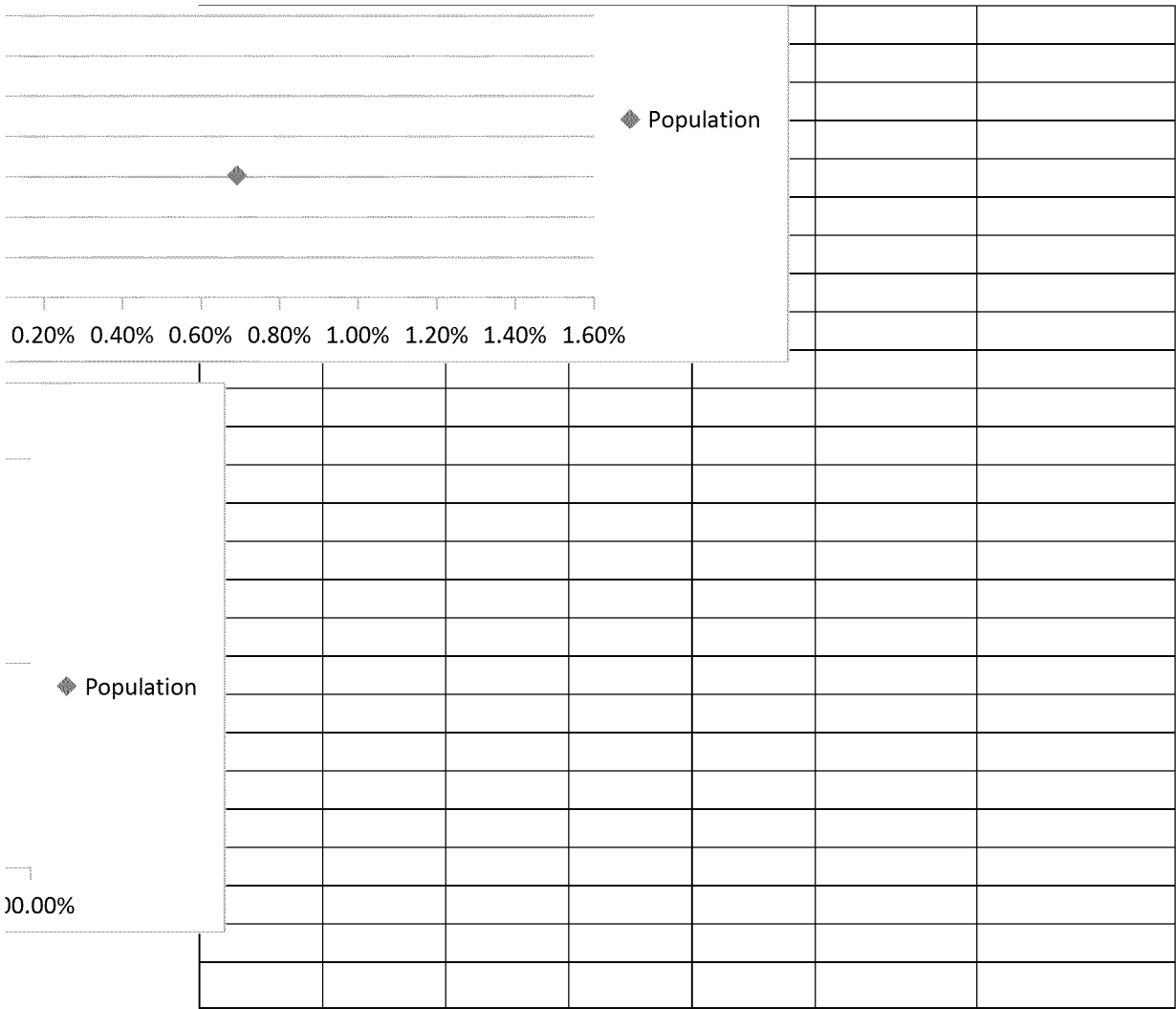
wastewater MHI %						
MHI Needed to get to WERF Level 2						



Yellow fill = Greater than 2% MHI to reach to certain level of wastewater treatment
 Orange fill = Greater than 100% increase in wastewater fee costs to reach to certain level of waste
 Blue Fill = Town already meets the standard so no new costs or treatment needed

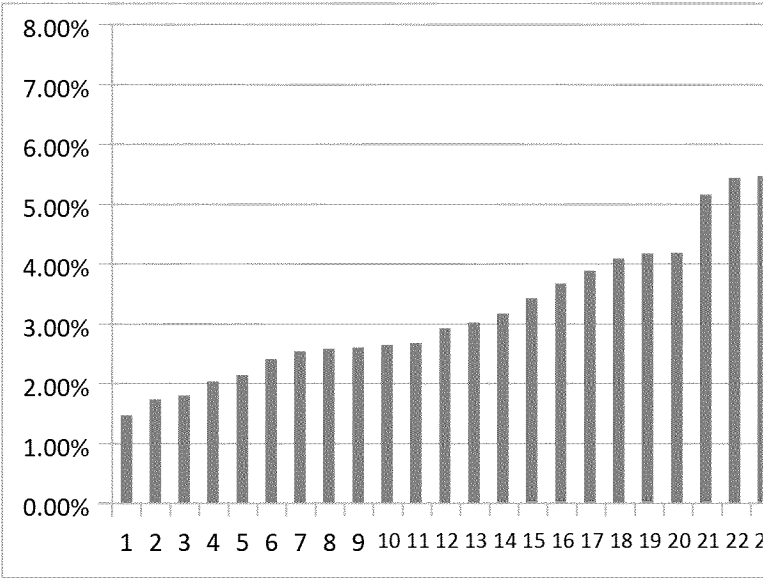


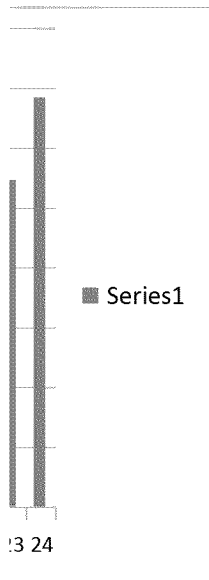




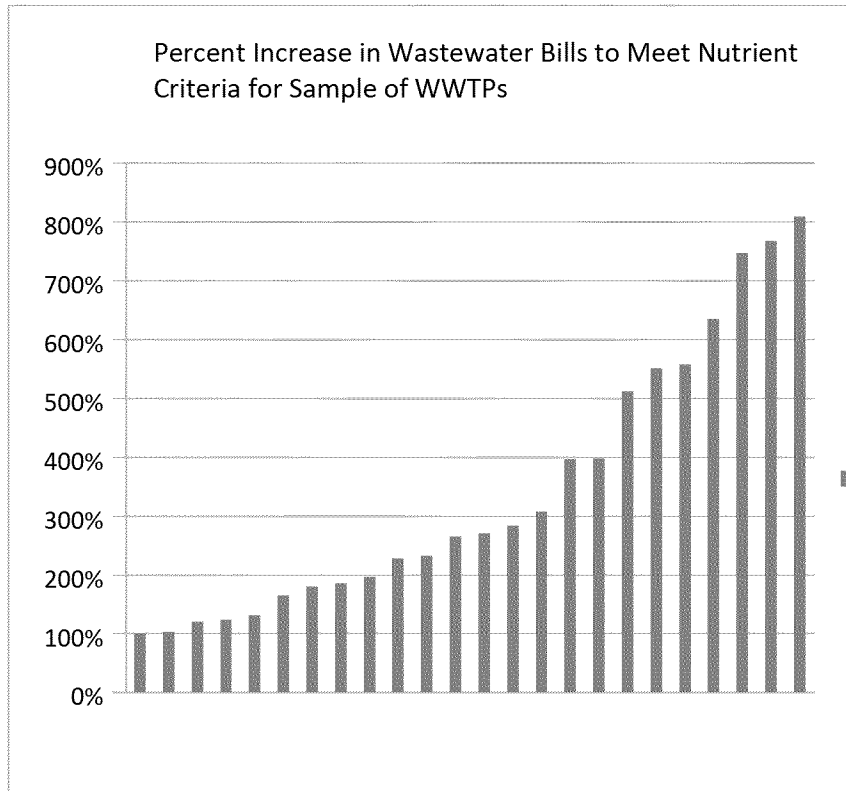
1.47%
1.74%
1.81%
2.04%
2.15%
2.41%
2.54%
2.58%
2.60%
2.65%
2.68%
2.92%
3.02%
3.17%
3.43%
3.67%
3.89%
4.09%
4.18%
4.19%
5.16%
5.44%
5.47%
6.85%

Total MHI% to meet nutrient criteria





100%
 103%
 120%
 123%
 131%
 165%
 180%
 186%
 196%
 228%
 232%
 264%
 270%
 283%
 307%
 396%
 398%
 511%
 551%
 557%
 635%
 747%
 767%
 808%





Community	Current Treatment Technology	Would the criteria apply? Or is there dilution capability?	Design Flow (MGD)	Actual Flow (MGD)	Community Population (Census 2010)	Number of Households (American Community Survey 2005-2009)
Big 7 Communities						
Kalispell	BNR (modified Johannesburg); 3.1 to 5.4 MGD; avg. .12 mg/l TP; 10 mg/l TN.	Yes. EOP; Ashley Creek	5.4	3.10	19,927	7,705
Bozeman	some BNR now; 5-stage Barrdenpho; new plant will be BNR (1 mg/l TP; 3 mg/l TN starting in 2011); current 5.8 MGD; increasing to 13.9 mgd	Yes. Also Gallatin TMDL in the works.	13.8	5.80	37,280	14,614
Helena	BNR; 3 mg/l TP; 10 mg/l TN; design capacity of 5.4; current discharge ~3.0 MGD	Yes. WLA set in TMDL based on numeric criteria.	5.4	3.00	28,190	12,337
Butte	Current technology is activated sludge (TN of 18.5 mg/l; TP of 2.11 mg/l); under Order to Construct to membrane BNR; current design is 8.5 MGD; talking about lowering to 6.1 MGD. Sewer Fee based on DEQ estimates. Included in current fee is \$27 million upgrade in new capital costs and \$1.125 million in O&M costs which would bring them to 5 TN and 0.1 TP	Yes. EOP.	8.5	4.00	33,525	14,041
Billings	2ndary treatment; Design flow of 26 MGD (avg.) and 40 MGD max.	Yes. Discharge into the Yellowstone River.	26	26	104,170	41,841
Missoula	advanced secondary treatment facility with biological nutrient removal and ultraviolet disinfection; meets Clark Fork criteria w/ mixing zone. 8.2 mg/l TN; 0.16 -0.4 mg/l TP; get a mixing zone, meeting criteria currently. BNR. Design flow = 12 MGD ; actual flow = 9 MGD. (designed for 10 and 1). (HDR)	Yes. With mixing zone. Currently meeting criteria after mixing zone.	12	9	66,788	27,553

Great Falls	conventional 2ndary activated sludge (max 21-MGD; avg. 10 MGD)	Yes. Missouri River	26	26	58,505	23,998
Other Large Communities > 1 MGD						
Livingston	discharges into the Yellowstone; permit renewed in 2010; mechanical plant w/ 2 primary clarifiers, 3 rotating biological contactors, UV, installing co-composting. DMR shows 11 mg/l TN average (20 mg/l for May) and 2 mg/l TP (3 mg/l for May).	Yes. Discharge into the Yellowstone River.	5	2	7,044	3,188
Miles City	2ndary treatment plus oxidation ditch. 2011 permit. Algae plant study to remove nutrients. Extended aeration system w/2 oxidation ditches w/rotating brush aerators; 2 clarifiers and chlorine basin. TN avg of 23.5 mg/l; TP avg. 3.6 mg/l.	Yes. Discharge into the Yellowstone River.	3.7	2	8,410	3,518
Hamilton	BNR facility. t w/ extended aeration system. Oxidation ditch w/ rotating brush aerators. 3 clarifiers. Upgraded in 2010. TN avg. 5.5 mg/l; TP avg. 5 mg/l.	Yes	1.98	0.68	4,348	2,092
Lewistown	BNR plant. Focus on TP removal. 0.8 mg/l TP; 3-4 mg/l TN.	Yes	2.5	1.5	5,901	2,727
Havre	Discharges into the Milk River. Permit renewed in 2011. Activated sludge facility with effluent chlorination. 2006-2010 data showed avg. TP of 3.4 (TN not required). 2011 DMR showed TN of 19.4 mg/l; Tp of 1.3 mg/l.	Yes	1.8	1.38	9,310	3,709
Non-Lagoon Facilities with < 1MGD						
Columbia Falls	Newer plant. Designed to achieve 8 mg/l TN	Yes	0.766	0.37	4,688	1,621

Manhattan	Discharges into Diva Ditch. Permit renewed in 2010. Denitrification with fixed film suspended growth system, clarifiers and aerobic sludge digestion, UV. DMR data from winter quarter shows 11 mg/l TN and 1 mg/l TP. 2008-2010 showed avg. TN of 14 mg/l TN and 4 mg/l TP.	Yes	0.6	0.4	1,520	523
Lolo	No steps towards nutrient removal. For Lolo, TN is generally less than 30 mg/l and TP less than 7. Generally heaving loadings for Lolo. Sewer rates--Lolo \$30.25-ish/mo - (RSID) based on property values	Yes	0.34	0.38	3,892	1,060
Stevensville	Stevensville is generally a little better with TN generally below 20 and TP less than 4.	Yes	0.3	0.29	1,809	795
Lagoons						
Philipsburg	lagoon - ref: Gary Swanson, consulting engineer- 15TN, 2TP	Yes.	0.2	0.2	820	399
Cut Bank	Lagoon.	Yes	0.643	0.643	2,869	1,290
Deer Lodge	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork	Yes	3.3	1.06	3,111	1,522
Glendive	domestic WW lagoon; 3 cell facultative; current O&M costs are <\$; 8-10 capital costs for new plant. O&M increase of ~\$300,000. new avg. 1.15 MGD; PER completed to upgrade to mechanical SBR or BNR plant.	Yes	1.3	0.6	4935	1883

Red Lodge	Lagoon.	Yes	1.2	0.65	2125	1055
Big Fork	Lagoon.	Yes	0.5	0.3	4270	1708
Highwood	Lagoon.	Yes	0.026	0.015	176	53
Circle	Lagoon.	Yes	0.16	0.065	615	234

NOTE: Operation costs include energy and chemical costs only and do not include labor and maintenance cost. As such, these numbers are on the low side.

NOTE: The numbers are intended to provide ROUGH ESTIMATES for discussion purposes and do not reflect the site-specific conditions at each plant.

NOTE: Capital costs were assumed to cover a 20-year bond with 5% interest (used 0.0802 conversion factor)

NOTE: MHI is based on data from Montana CEIC based on 2010 estimates.

	Indicates rough estimates; need to verify			
	Big Fork number of household based on population divided by 2.5			

Median Household Income (2010) - American Community Survey.	Current average household sewer bill per year (2008 / 2011)	Current average sewer fee as % of MHI	Notes	Capital cost (million dollars) to meet the numeric nutrient criteria (WERF)	Annual Capital cost to meet the numeric nutrient criteria (L4 WERF)	Annual Operations costs to meet the numeric nutrient criteria L4WERF	Annual Capital and Operations cost (\$)
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Big 7 Communities

\$39,953.00	\$361.68	0.91%	Sewer rates obtained from City in 2011. Plant ~WERF Level 2. \$30.14/month Based on a base rate of \$15.00 with a usage rate of \$4.19/1000 gal of water used	49.14	\$3,941,028	\$1,228,530	\$5,169,558
\$41,661.00	\$372.00	0.89%	Sewer rates obtained from City in 2011. Plant ~WERF Level 2. Really Level 3 for TN and 1 for TP	125.58	\$10,071,516	\$2,298,540	\$12,370,056
\$47,152.00	\$277.80	0.59%	Sewer rates obtained from City in 2011. Plant ~ WERF Level 1.	67.50	\$5,413,500	\$1,298,400	\$6,711,900
\$37,335.00	\$360.00	0.96%	Sewer Fee based on DEQ estimates. While current monthly fee is \$13.50, the \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP (WERF 3) would raise rates to \$30 per month	62.90	\$5,044,580	\$1,161,800	\$6,206,380
\$45,004.00	\$218.28	0.49%	The numbers for Billings and Great Falls (treatment levels, treatment costs etc.) were obtained from HDR.	312.50	\$25,062,500	\$11,252,800	\$36,315,300
\$34,319.00	\$152.14	0.44%	Sewer rates obtained from city. 2011 values.	88.80	\$7,121,760	\$2,614,050	\$9,735,810

\$40,718.00	\$187.20	0.46%	At WERF 1. The numbers for Billings and Great Falls (population, treatment levels, etc.) were obtained from HDR.	312.50	\$25,062,500	\$11,252,800	\$36,315,300
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Other Large Communities > 1 MGD

\$35,689.00	\$600.00	1.68%	Assume WERF Tier 1	62.50	\$5,012,500	\$865,600	\$5,878,100
\$37,554.00	\$236.10	0.63%	Assume WERF Tier 1	46.25	\$3,709,250	\$865,600	\$4,574,850
\$25,161.00	\$276.00	1.10%	Assume WERF 2 (since TN gets to WERF 3 and TP WERF 1)	24.75	\$1,984,950	\$301,984	\$2,286,934
\$31,729.00	\$387.60	1.22%	Assume WERF 3 based on current treatment levels	18.50	\$1,483,700	\$423,675	\$1,907,375
\$43,577	\$240.00	0.55%	Assumed WERF Level 1 and 5,000 gallons usage. Rate is \$9.15 flat plus \$2.15 per 1,000 gallons	\$22.50	\$1,804,500	\$597,264	\$2,401,764

Non-Lagoon Facilities with < 1MGD

\$38,750	\$532.20	1.37%	Upgrade to RO	\$5.67	\$454,606	\$580,900	\$1,035,506
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\$50,729	\$362.40	0.71%	Assumed WERF Level 2. Correct? Paul.	\$5.46	\$437,892	\$63,408	\$501,300
\$46,442	\$363.00	0.78%	Level 1.	\$4.25	\$340,850	\$164,464	\$505,314
\$33,776	\$535.08	1.58%		\$3.75	\$300,750	\$125,512	\$426,262

Lagoons

\$31,375.00	\$200.00	0.64%	Assume WERF 1	\$4.36	\$ 349,672.00	94,810.00	\$444,482.00
\$44,833	\$138.48	0.31%	4000 gallons. Base rate \$9.48 at 3000 gallons plus \$2.06 for next 1,000 gallons	\$14.02	\$ 1,124,195.48	246,140.40	\$1,370,335.88
\$40,320	\$409.56	1.02%	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork	\$71.94	\$1,261,145.00	\$502,493.00	\$1,763,638.00
\$42,821	\$213.96	0.50%		\$28.34	\$2,272,868.00	\$284,430.00	\$2,557,298.00

\$50,123	305.28	0.61%	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$26.16	\$2,098,032.00	\$308,132.50	\$2,406,164.50
\$44,398	580.36	1.31%		\$10.90	\$874,180.00	\$142,215.00	\$1,016,395.00
\$62,614	600.00	0.96%		\$0.57	\$45,457.36	\$7,110.75	\$52,568.11
\$29,000	259.56	0.90%		\$3.49	\$279,737.60	\$30,813.25	\$310,550.85

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Annual Additional Cost per Household (increase in sewer rate)	Predicted average household sewer fee to meet criteria	Expected % MHI to Meet Base Numeric Nutrient Criteria (plus current wastewater fees)	Percent increase in Wastewater bill		
\$671	\$1,033	2.58	186%		
\$846	\$1,218	2.92	228%		
\$544	\$822	1.74	196%		
\$442	\$802	2.15	123%		
\$868	\$1,086	2.41	398%		
\$353	\$505	1.47	232%		

	\$1,513	\$1,700	4.18	808%		
	\$1,844	\$2,444	6.85	307%		
	\$1,300	\$1,537	4.09	551%		
	\$1,093	\$1,369	5.44	396%		
	\$699	\$1,087	3.43	180%		
	\$648	\$888	2.04	270%		
					265-6719 - City Office	
	\$639	\$1,171	3.02	120%		

\$959	\$1,321	2.60	264%		
\$477	\$840	1.81	131%		
\$536	\$1,071	3.17	100%		
\$1,113.99	\$1,314	4.19	557%		
\$1,062.28	\$1,201	2.68	767%		
\$1,158.76	\$1,568	3.89	283%		
\$1,358.10	\$1,572	3.67	635%		

\$2,280.72	\$2,586	5.16	747%		
\$595.08	\$1,175	2.65	103%		
\$991.85	\$1,592	2.54	165%		
\$1,327.14	\$1,587	5.47	511%		

WERF

Level	Description	Capital Cost (\$/gpd)	Operations (\$1/ MG/day Treated)
Level 1	No N and P removal	9.3	250
Level 2	1 mg/l TP; 8 mg/l TN	12.7	350
Level 3	0.1-0.3 mg/l TP; 4-8 mg/l TN	14.4	640
Level 4	<0.1 mg/l TP; 3 mg/l TN	15.3	880
Level 5	<0.01 mg/l TP; 1 mg/l TN	21.8	1370

Costs to Meet Criteria	Capital Cost(\$million/MGD)	Design Flow	Facility Upgrade Capital Costs (\$million)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)
Kalispell	9.1	5.4	\$49.14	\$3.94
Bozeman	9.1	13.8	\$125.58	\$10.07
Helena	12.5	5.4	\$67.50	\$5.41
Butte	7.4	8.5	\$62.90	\$5.04
Billings	12.5	25	\$312.50	\$25.06
Missoula	7.4	12	\$88.80	7.12176
Great Falls	12.5	25	\$312.50	25.0625
Livingston	12.5	5	\$62.50	\$5.01
Miles City	12.5	3.7	\$46.25	\$3.71
Hamilton	12.5	1.98	\$24.75	1.98495
Lewistown	7.4	2.5	\$18.50	1.4837
Havre	12.5	1.8	\$22.50	1.8045
Columbia Falls	7.4	0.766	\$5.67	0.45461
Manhattan	9.1	0.6	\$5.46	0.43789
Lolo	12.5	0.34	\$4.25	0.34085
Stephensville	12.5	0.3	\$3.75	0.30075
Philipsburg	21.8	0.2	\$4.36	\$0.35
Cut Bank	21.8	0.643	\$14.02	\$1.12
Deer Lodge	21.8	3.3	\$71.94	\$5.77
Glendive	21.8	1.3	\$28.34	2.27287
Red Lodge	21.8	1.2	\$26.16	2.09803
Big Fork	21.8	0.5	\$10.90	0.87418
Highwood	21.8	0.026	\$0.57	0.04546
Circle	21.8	0.16	\$3.49	0.27974

Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)	Operations (\$1/ MG/day Treated)	Operations Costs (\$/ year/ 1 MGD)	Actual Flow	Facility Upgrade Operations Costs (annual) based on Facility MGD	Membrane Replacement Cost (\$24,000 /yr/1 MGD)* Actual Flow
\$3,941,028.00	1020	372,300.00	3.10	1,154,130.00	74,400.00
\$10,071,516.00	1020	372,300.00	5.80	2,159,340.00	139,200.00
\$5,413,500.00	1120	408,800.00	3.00	1,226,400.00	72,000.00
\$5,044,580.00	730	266,450.00	4.00	1,065,800.00	96,000.00
\$25,062,500.00	1120	408,800.00	26.00	10,628,800.00	624,000.00
\$7,121,760.00	730	266,450.00	9.00	2,398,050.00	216,000.00
\$25,062,500.00	1120	408,800.00	26	10,628,800.00	624,000.00
\$5,012,500.00	1120	408,800.00	2.00	817,600.00	48,000.00
\$3,709,250.00	1120	408,800.00	2.00	817,600.00	48,000.00
\$1,984,950.00	1120	408,800.00	0.68	277,984.00	24,000.00
\$1,483,700.00	730	266,450.00	1.50	399,675.00	24,000.00
\$1,804,500.00	1120	408,800.00	1.38	564,144.00	33,120.00
\$454,605.68	730	266,450.00	2.00	532,900.00	48,000.00
\$437,892.00	1020	372,300.00	0.16	59,568.00	3,840.00
\$340,850.00	1120	408,800.00	0.38	155,344.00	9,120.00
\$300,750.00	1120	408,800.00	0.29	118,552.00	6,960.00
\$349,672.00	1370	450,050.00	0.20	90,010.00	4,800.00
\$1,124,195.48	1120	358,800.00	0.64	230,708.40	15,432.00
\$5,769,588.00	1370	450,050.00	1.06	477,053.00	25,440.00
\$2,272,868.00	1370	450,050.00	0.6	270,030.00	14,400.00
\$2,098,032.00	1370	450,050.00	0.65	292,532.50	15,600.00
\$874,180.00	1370	450,050.00	0.30	135,015.00	7,200.00
\$45,457.36	1370	450,050.00	0.015	6,750.75	360.00
\$279,737.60	1370	450,050.00	0.065	29,253.25	1,560.00

Total Operations costs including membrane replacement
1,228,530.00
2,298,540.00
1,298,400.00
1,161,800.00
11,252,800.00
2,614,050.00
\$11,252,800.00
\$865,600.00
\$865,600.00
301,984.00
423,675.00
\$597,264.00
\$580,900.00
\$63,408.00
\$164,464.00
\$125,512.00
\$94,810.00
\$246,140.40
\$502,493.00
\$284,430.00
\$308,132.50
\$142,215.00
\$7,110.75
\$30,813.25

Community	Current Treatment Technology
> 1 MGD	
Kalispell	Already below variance levels; achieving avg. 0.12 mg/l TP and 10 mg/l TN. Town expected to pay an addition \$6,967,150.56 annually to achieve 2% MHI.
Bozeman	Already below variance levels; should be close to achieving 1 mg/l TP and 3 -5 mg/l TN starting in 2011/2-12. Town expected to pay an additional \$8,319,750.2 annually to achieve 2% MHI.
Helena	After optimization study, should be achieving variance levels. Currently at 3 mg/l TP and 10 mg/l TN. Town expected to pay an additional \$9,633,963.3 annually to achieve 2%MHI.
Butte	Under Order to Construct to membrane BNR Will already meet variance levels after upgrade. The \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP. Upgrade would result in 1.5% MHI. Additional costs needed?
Missoula	Already meets Clark Fork criteria w/ mixing zone. Achieving 8.2 mg/l TN; 0.16 -0.4 mg/l TP. Would the town be expected to pay more (~\$18 million annually) towards 2% MHI or not since they are achieving the criteria?
Great Falls	Conventional 2ndary activated sludge (max 21-MGD; avg. 10 MGD). Based on Billings case study, likely long-term variance limits of Level 4 for WERF (0-.1 mg/l TP; 3 mg/l TN)
Billings	2ndary treatment; Design flow of 26 MGD (avg.) and 40 MGD max. Based on Billings case study, likely long-term variance limits of Level 4 for WERF (0-.1 mg/l TP; 3 mg/l TN)

Livingston	Based on existing high costs, likely that meeting 1 mg/l and 10 TN would be the feasible limits. MHI of 3.05 percent to achieve WERF level 3.
Miles City	2011 permit; calculated variance limits to <0.1 mg/l TP; 3 mg/l TN
Hamilton	BNR facility. t w/ extended aeration system. Oxidation ditch w/ rotating brush aerators. 3 clarifiers. Upgraded in 2010.
Lewistown	Already below variance levels;BNR plant. Lready below proposed interim effluent limits (0.8 mg/l TP; 3-4 mg/l TN).
Facilities with < 1MGD	
Manhattan	Discharges into Diva Ditch. Permit renewed in 2010. Denitrification with fixed film suspended growth system, clarifiers and aerobic sludge digestion, UV. DMR data from winter quarter shows 11 mg/l TN and 1 mg/l TP. 2008-2010 showed avg. TN of 14 mg/l TN and 4 mg/l TP.
Columbia Falls	Columbia Falls already meets variance level standards. Actual cost of \$3,927,688
Havre	Discharges into the Milk River. Permit renewed in 2011. Activated sludge facility with effluent chlorination. 2006-2010 data showed avg. TP of 3.4 (TN not required). 2011 DMR showed TN of 19.4 mg/l; Tp of 1.3 mg/l.
Lagoons	
Philipsburg	lagoon to simple mechanical system - ref: Gary Swanson, consulting engineer- 15TN, 2TP; Do we have actual costs for the upgrade?
Cut Bank	

Deer Lodge	Moving from an existing lagoon to mechanical plant with land application. Ref: planning document--To get to variance only. Because this would be a land application system, so theoretically, the N and P would be zero to the Clark Fork
Glendive	Upgrade from a lagoon to mechanical plant - BNR or otherwise would result in > 2%MHI
Redlodge	Upgrade from a lagoon to mechanical plant - BNR or otherwise would result in >1.5% MHI

2% MHI information
draft numbers pending input

Flow Category	Community Population	Number of Households (Population / 2.5) based on 2000 Census	Median Household Income (2010) - countywide MHI. Recommend updating for service area.	Current average household sewer bill per year (2008 / 2011)
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> 1 MGD (1 mg/l TP; 10 mg/l TN)	27,544	10,012	\$45,594.00	\$216.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	37,280	14,614	\$47,065.00	\$372.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	28,190	12,337	\$52,317.00	\$265.44
> 1 MGD (1 mg/l TP; 10 mg/l TN)	33,525	14,041	\$40,055.00	\$360.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	108,623	28,290	\$40,130.00	\$152.14
> 1 MGD (1 mg/l TP; 10 mg/l TN)	82,178	23,998	\$40,434.00	\$187.20
> 1 MGD (1 mg/l TP; 10 mg/l TN)	104,170	41,841	\$45,004.00	\$218.28

> 1 MGD (1 mg/l TP; 10 mg/l TN)	7414	2965.6	35,689	\$600.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	9500	3800	37,554	\$236.10
> 1 MGD (1 mg/l TP; 10 mg/l TN)	5,200	2080	25,161	\$276.00
> 1 MGD (1 mg/l TP; 10 mg/l TN)	5,813	2,325	31,729	\$387.60

Facilities with

Yes	1,520	523	\$50,729	\$362.40
Yes- but Columbia Falls already meets it	4,688	1,621	\$38,750	\$532.20
	10,325.00	4130	\$38,082	240.00

Yes.	820	399	35806.00	200
Yes	2,869	1,290	\$29,000	\$138.48

Yes	3,111	1,522	\$40,320	\$409.56
	4621.00	1848.40	37000.00	213.96
	9,756.00	3,902	\$40,379	305.28

Current average sewer fee as % of MHI	Notes	Capital cost (million dollars) to meet the approximate variance levels (WERF)	Annual Capital cost to meet the approximate variance levels (L4 WERF)
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> 1 MGD

0.47%	Already meeting variance levels. Sewer rates obtained from City in 2011. Plant ~WERF Level 2.	\$0.00	\$0.00
0.79%	Already meeting variance levels. Sewer rates obtained from City in 2011. Plant ~WERF Level 2. Really Level 3 for TN and 1 for TP	\$0.00	\$0.00
0.51%	Sewer rates obtained from City in 2011. Plant ~ WERF Level 1.	\$18.36	\$1,472,472.00
0.90%	Will already meet variance levels after upgrade. While current monthly fee is \$13.50, the \$27 million upgrade in new capital costs plus \$1.125 million in additional O&M costs which would bring them to 5 TN and 0.1 TP would raise rates to \$30 per month	\$27.00	\$2,165,400.00
0.38%	Already meets variance levels	\$0.00	\$0.00
0.46%	and Great Falls (treatment levels, cost, etc.) were obtained from HDR.	\$85.00	\$6,817,000.00
0.49%	and Great Falls (treatment levels, cost, etc.) were obtained from HDR.	\$85.00	\$6,817,000.00

1.68%		17.00	1,363,400.00
0.63%		22.20	1,780,440.00
1.10%		5.00	793,980.00
1.22%		1.00	200,500.00

Facilities with < 1MGD

0.71%	Mainly designed to remove ammonia and some TN, but now have NO3 limit. May be able to meet with operational changes. TP of 2 mg/l may require more capital & O&M expenses. Ref: planning document, SRF loan application	\$7.56	\$606,312.00
1.37%	Upgrade to an existing Chemical P-removal plant - actual effluent concentrations are 4 TN and 0.05TP-- already included in current fee	\$0.00	\$0.00
0.63%	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$26.40	\$2,117,280.00

Lagoons

0.56%	lagoon to simple mechanical system - ref: Gary Swanson, consulting engineer- 15TN, 2TP	\$0.68	\$54,536.00
0.48%	4000 gallons. Base rate \$9.48 at 3000 gallons plus \$2.06 for next 1,000 gallons	\$21.80	\$1,018,540.00

1.02%		\$15.25	\$1,261,145.00
0.58%		\$10.00	\$802,000.00
	Sewer Fee and MHI based on DEQ estimates. DEQ MHI value less than the 2010 USDA county data.	\$10.00	\$802,000.00

Annual Operations costs to meet the approximate variance levels L4WERF	Annual Capital and Operations cost (\$)	Annual Additional Cost per Household (increase in sewer rate)	Predicted average household sewer fee to meet criteria	Expected % MHI to Meet Variance Numbers (plus current wastewater fees)
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0.00	\$0.00	\$0.00	\$216	0.47
0.00	\$0.00	\$0.00	\$372	0.79
109,500.00	\$1,581,972.00	\$128.23	\$394	0.75
1,125,000.00	\$3,290,400.00	\$234.34	\$594	1.48
\$0.0	\$0.00	\$0.00	\$152	0.38
\$949,000.0	\$7,766,000.00	\$323.61	\$511	1.26
\$949,000.0	\$7,766,000.00	\$185.61	\$404	0.90

\$73,000.00	\$1,436,400.00	\$484.35	\$1,084	3.04
\$459,900.00	\$2,240,340.00	\$589.56	\$826	2.20
\$238,000.00	\$1,031,980.00	\$496.14	\$772	3.07
\$150,000.00	\$350,500.00	\$150.74	\$538	1.70

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	100,000.00	\$706,312.00	\$1,350.50	\$1,713	3.38
	0.00	\$0.00	\$0.00	\$532	1.37
	643860	\$2,761,140.00	\$668.56	\$909	2.39

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	7,300.00	\$61,836.00	\$154.98	\$355	0.99
	7,300.00	\$1,025,840.00	\$795.22	\$934	3.22

602,000.00	\$1,863,145.00	\$1,224.14	\$1,634	4.05
300,000.00	\$1,102,000.00	\$596.19	\$810	2.19
300,000.00	\$1,102,000.00	\$282.39	\$588	1.46

	Percent increase in Wastewater bill	2% MHI	Total additional annual amount town would spend total to get to 2% MHI	
	0%	\$911.88	\$6,967,150.56	\$6,967,150.56
	0%	\$941.30	\$8,319,750.20	\$8,319,750.20
	48%	\$1,046.34	\$9,633,963.30	\$9,633,963.30
	65%	\$801.10	\$6,193,485.10	\$6,193,485.10
	0%	\$802.60	\$18,401,513.40	\$18,401,513.40
	173%	\$808.68	\$14,914,277.04	\$14,914,277.04
	85%	\$900.08	\$28,527,193.80	\$28,527,193.80

81%		
373%		
	\$1,014.58	\$341,090.14
0%		
	\$775.00	\$393,578.80
279%		
77%		
	\$716.12	\$205,931.88
574%		
	\$580.00	\$569,560.80

299%		
	\$806.40	\$603,990.48

WERF

Level	Description	Capital Cost (\$/gpd)	Operations (\$1,000/yr/10 MG Treated)
Level 1	No N and P removal	9.3	250
Level 2	1 mg/l TP; 8 mg/l TN	12.7	350
Level 3	0.1-0.3 mg/l TP; 4-8 mg/l TN	14.4	640
Level 4	<0.1 mg/l TP; 3 mg/l TN	15.3	880
Level 5	<0.01 mg/l TP; 1 mg/l TN	21.8	1370

Costs to Meet Criteria	Capital Cost (\$million/MGD)	Design Flow	Facility Upgrade Capital Costs (\$million)	Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)
Kalispell	0	5.4	\$0.00	\$0.00
Bozeman	0	13.8	\$0.00	\$0.00
Helena	3.4	5.4	\$18.36	\$1.47
Butte	Actual Costs	1	\$27.00	\$2.17
Missoula				
Great Falls	3.4	25	\$85.00	6.817
Billings	3.4	25	\$85.00	\$6.82
Livingston	3.4	5	\$17.00	1.3634
Miles City	6	3.7	\$22.20	1.78044
Hamilton	5	1.98	\$9.90	0.79398
Lewistown	1	2.5	\$2.50	0.2005
Manhattan				
Columbia Falls	Actual Costs	0.766	\$3,927,688.00	\$315,000.58
Havre	6	4.4	\$26.40	2.11728
Philipsburg	3.4	0.2	\$0.68	\$0.05
Cut Bank				
Deer Lodge				
Glendive	10		\$10.00	0.802
Red Lodge				

Annualized Capital Costs (Assumed 20-yr bond & 5% interest; \$million/year)	Operations (\$1/ MG/day Treated)	Operations Costs (\$/ year/ 1 MGD)	Actual Flow	Facility Upgrade Operations Costs (\$/year/1 MGD) based on Facility MGD	Membrane Replacement Cost (\$24,000 /yr/1 MGD)*Actual Flow - not necessary b/c no RO
\$0.00	0	0.00	3.10	0.00	0.00
\$0.00	0	0.00	5.80	0.00	0.00
\$1,472,472.00	100	36,500.00	3.00	109,500.00	0.00
\$2,165,400.00	0	0.00	4.00	1,125,000.00	0.00
\$6,817,000.00	100	36,500.00	26	949,000.00	0.00
\$6,817,000.00	100	36,500.00	26.00	949,000.00	0.00
\$1,363,400.00	100	36,500.00	2.00	73,000.00	0.00
\$1,780,440.00	630	229,950.00	2	459,900.00	0.00
\$793,980.00		350,000	0.68	238,000.00	
\$200,500.00		100,000.00	1.5	150,000.00	

\$315,000.58	0	0.00	0.37	0.00	0.00
\$2,117,280.00	630	229,950.00	2.8	643,860.00	0.00
\$54,536.00	100	36,500.00	0.20	7,300.00	0.00

\$802,000.00		300,000		300,000	
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Total Operations costs including membrane replacement
0.00
0.00
109,500.00
1,125,000.00
\$949,000.00
949,000.00
\$73,000.00
\$459,900.00
238,000.00
150,000.00

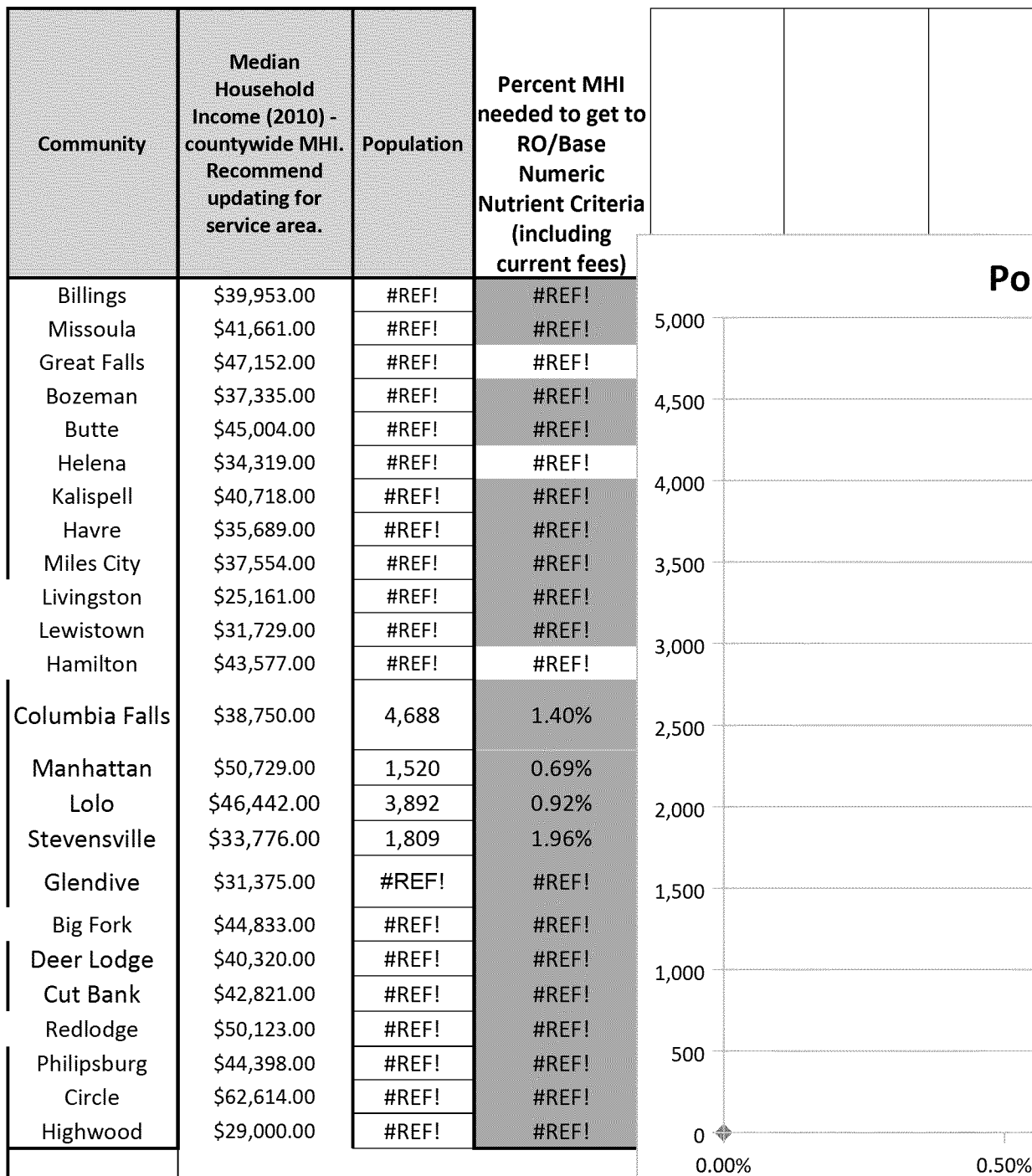
\$0.00
\$643,860.00
7,300.00

300,000

	Community	Median Household Income (2010) - ACS 5 year survey	Population	Estimated Number of Households (ACS or Population / 2.5) based on 2010	Current Average Annual Household Wastewater Bill (1000 gallons/month)	Design Flow (MGD)	Actual Flow (MGD)	Current wastewater MHI %	Percent MHI Needed to get to WERF Level 2
	Big Fork	\$52,147.00	4,270	1,708	\$580.36	0.69	0.3	1.11%	1.34%
	Big Sky	\$49,850.00	2,308	514	\$357.24	0.44	0.22	0.72%	1.22%
	Chinook	\$36,389.00	1,203	696	\$464.88	0.5	0.167	1.28%	1.84%
	Choteau	\$33,241.00	1,684	802	\$464.88	0.3	0.219	1.40%	1.74%
	Colstrip	\$74,095.00	2,214	812	\$464.88	0.6	0.48	0.63%	0.93%
	Columbia Falls	\$38,107.00	4,688	1,875	\$532.20	0.766	0.37	1.40%	1.40%
	Conrad	\$39,444.00	2,570	1,208	\$464.88	0.5	0.375	1.18%	1.49%
	East Helena	\$46,227.00	1,984	794	\$279.60	0.434	0.322	0.60%	0.96%
	Forsyth	\$38,661.00	1,777	722	\$464.88	0.54	0.248	1.20%	1.76%
	Laurel	\$40,906.00	6,718	2,603	\$464.88	0.88	0.853	1.14%	1.39%
	Libby	\$25,167.00	2,628	1,290	\$218.52	0.511	0.381	0.87%	1.34%
	Manhattan	\$52,350.00	1,520	523	\$362.40	0.6	0.4	0.69%	0.69%
	Lolo	\$50,469.00	3,892	1,060	\$363.00	0.34	0.38	0.72%	0.92%
	Poplar	\$19,026.00	810	405	\$224.04	0.6	0.24	1.18%	3.41%
	Stevensville	\$33,293.00	1,809	795	\$535.08	0.3	0.29	1.61%	1.96%
		Yellow fill = Greater than 2% MHI to reach to certain level of wastewater treatment							
		Orange fill = Greater than 100% increase in wastewater fee costs to reach to certain level of w							

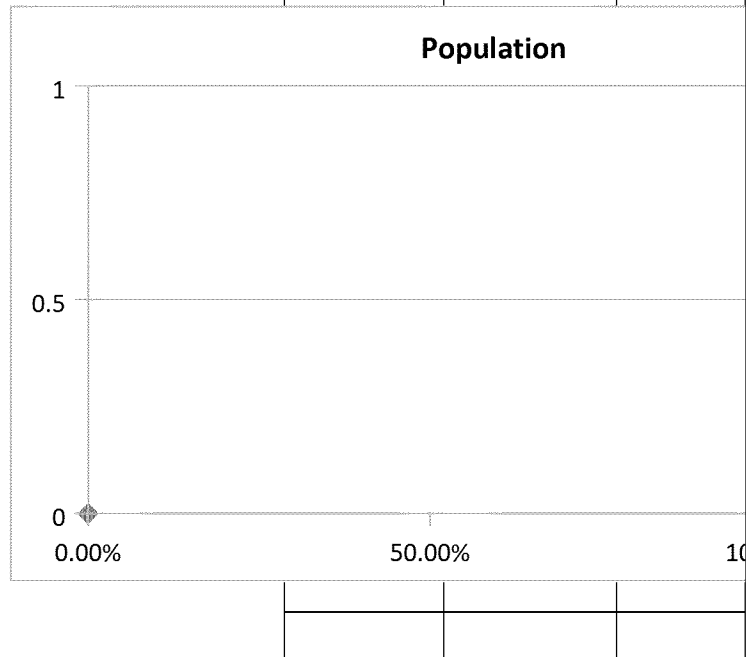
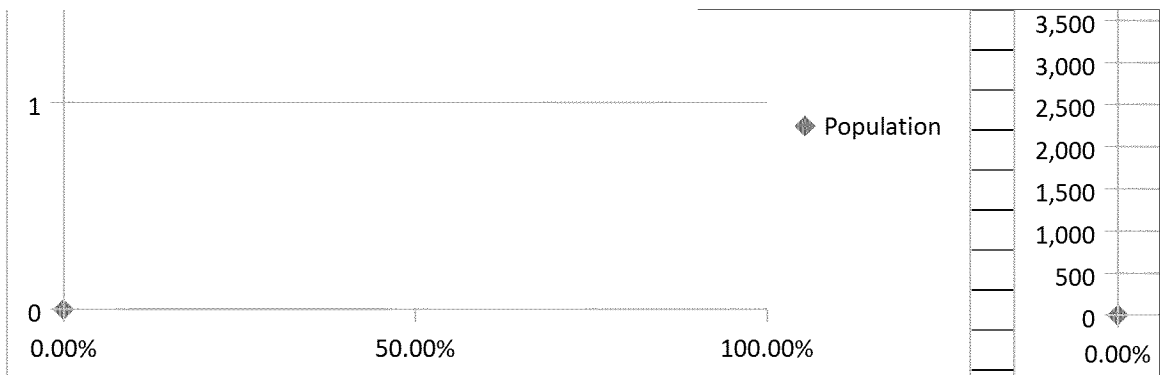
Percent Increase over current Wastewater Bill to Reach WERF 2	Percent MHI needed to get to Variance in SB367 (including current fees)	Increase over current Wastewater Bill to Reach Variance	2% MHI per household	Total additional annual amount Town Would Need to Spend to get to 2% MHI
20%				
70%				
44%				
24%				
48%				
0%	1.37%	0%	\$762	\$431,183
27%				
59%				
47%				
22%				
54%				
0%	3.38%	373%	\$1,047	\$358,046
28%				
190%				
22%				

astewater treatment



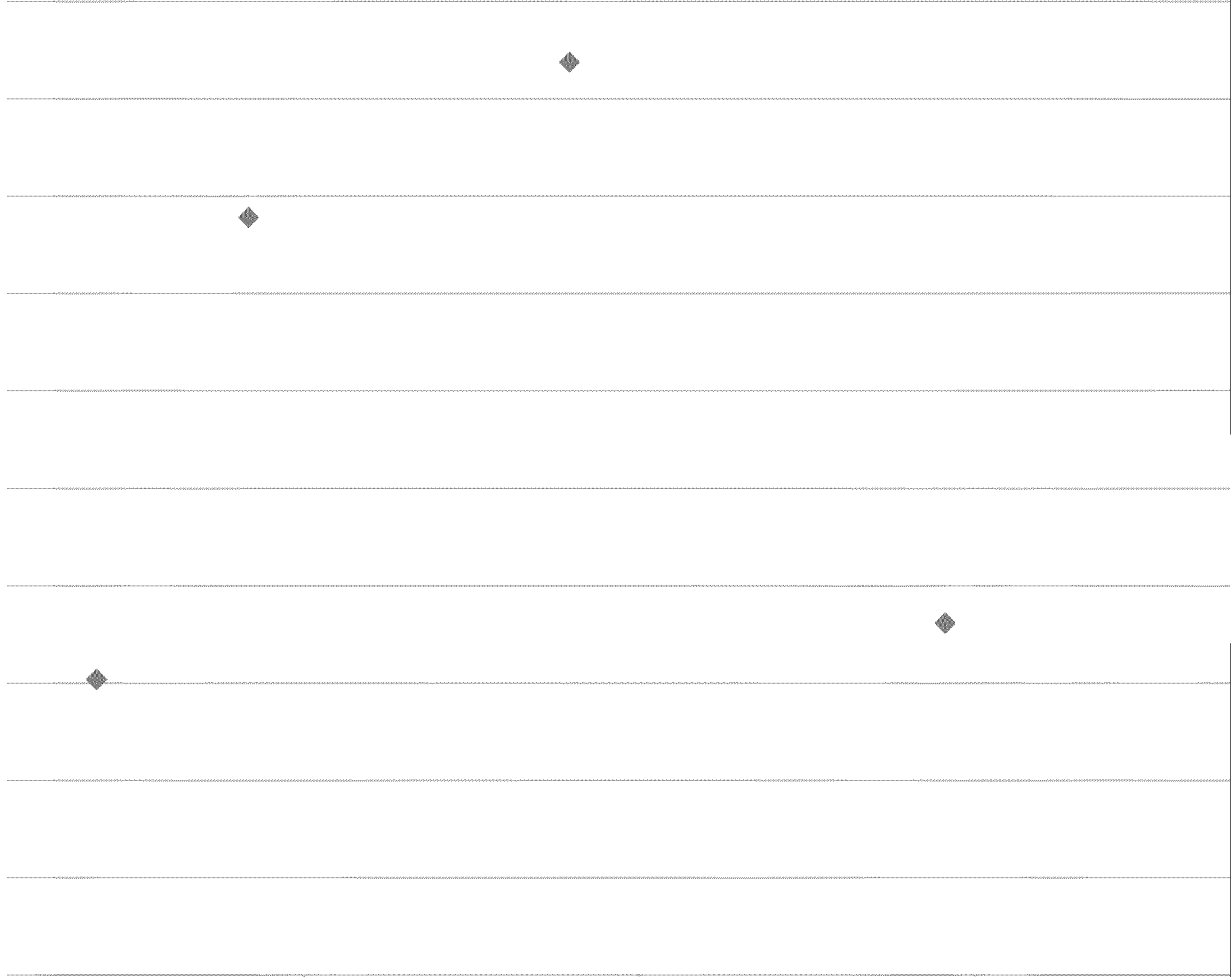
Yellow fill = Greater than 2% MHI to reach to certain level of wastewater treatment
 Orange fill = Greater than 100% increase in wastewater fee costs to reach to certain level of waste
 Blue Fill = Town already meets the standard so no new costs or treatment needed





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Population vs Percent MHI Needed to Reach Base Criteria

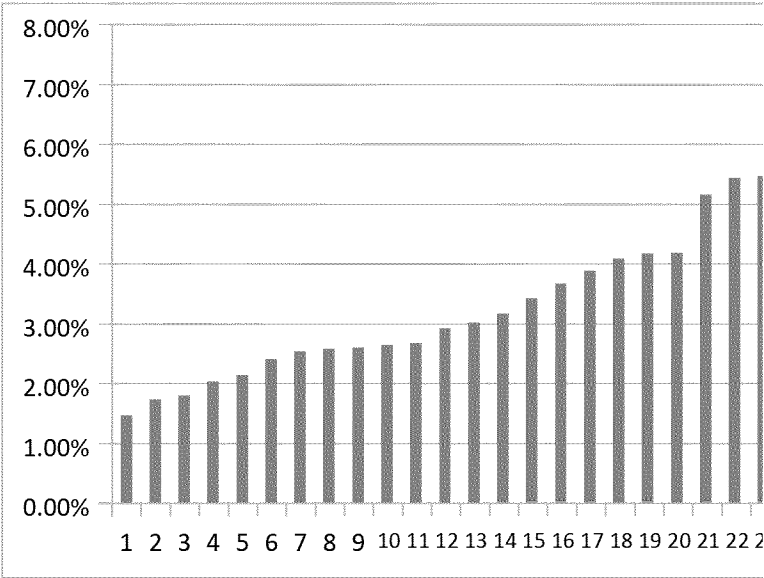


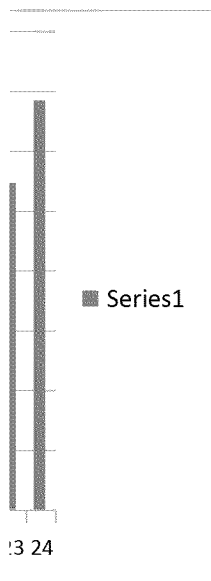
	1.00%	1.50%	2.00%
water treatment			

Population vs. %MHI--Other Non lagoons				

1.47%
1.74%
1.81%
2.04%
2.15%
2.41%
2.54%
2.58%
2.60%
2.65%
2.68%
2.92%
3.02%
3.17%
3.43%
3.67%
3.89%
4.09%
4.18%
4.19%
5.16%
5.44%
5.47%
6.85%

Total MHI% to meet nutrient criteria





100%
 103%
 120%
 123%
 131%
 165%
 180%
 186%
 196%
 228%
 232%
 264%
 270%
 283%
 307%
 396%
 398%
 511%
 551%
 557%
 635%
 747%
 767%
 808%

